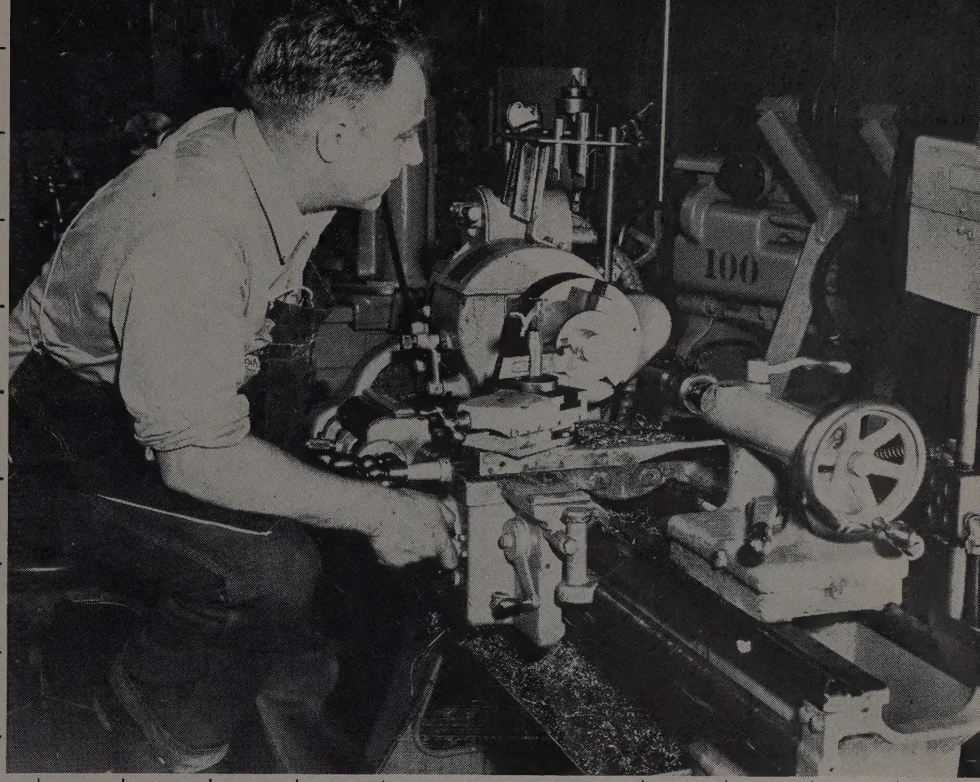
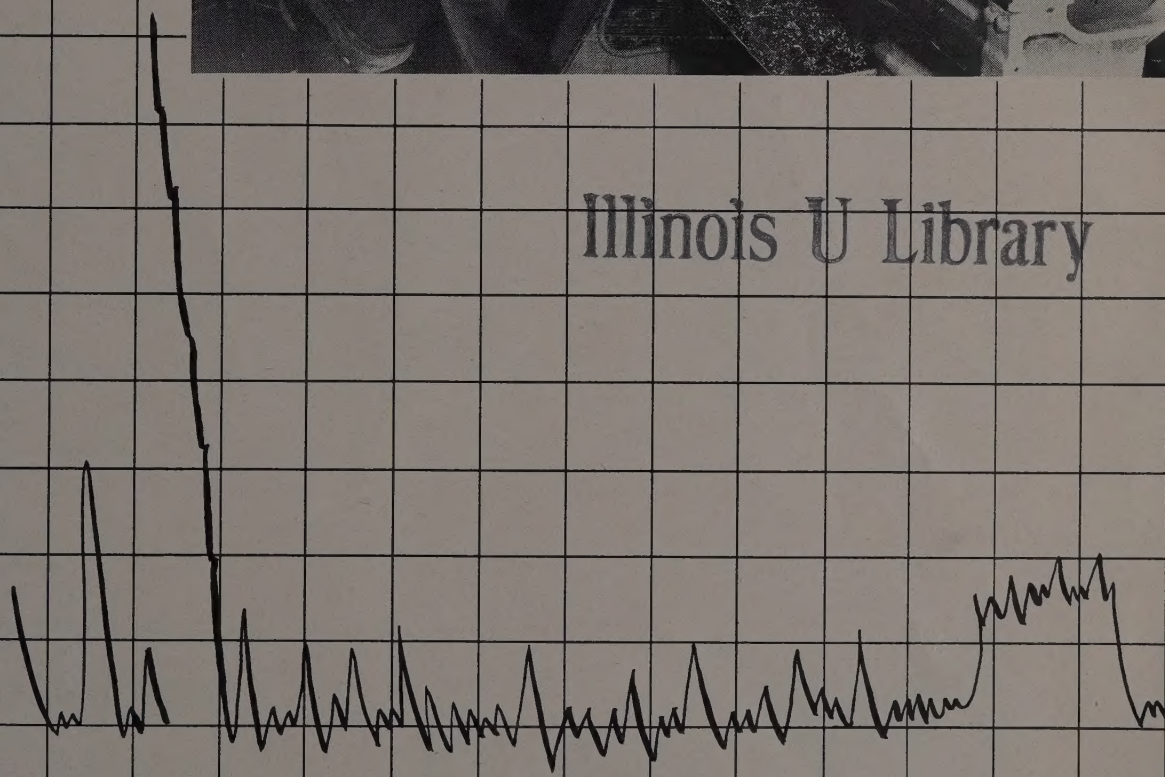
2.5¢



Illinois U Library



the

illinois technograph

ber
n. a.

january, 1952

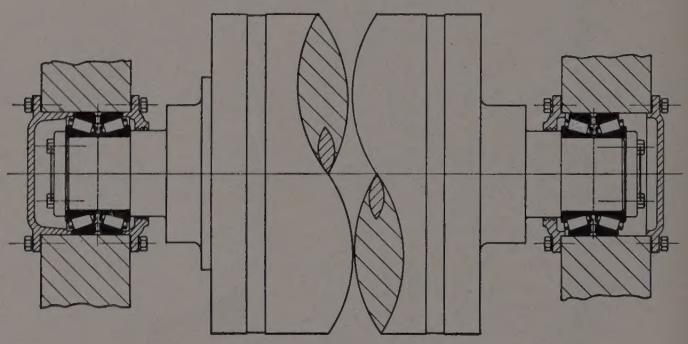
Another page for **YOUR BEARING NOTEBOOK**

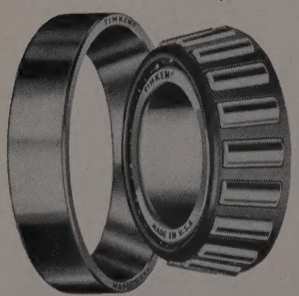
How to keep a color press in the pink

Long-lasting precision and speed are necessary requirements in single color offset press lithography. To meet these requirements, engineers mount vital cylinder shafts and main drive shafts of presses on Timken® tapered roller bearings. Due to tapered construction, Timken bearings carry any combination of radial and thrust loads—hold shafts in proper alignment. And Timken bearings eliminate all speed restrictions due to bearings, permitting more impressions per hour.

How to mount press cylinders

Type TNA Timken bearings are used at each end of this press cylinder. The bearing at the left is fixed by clamping the double cup while the other bearing is permitted to float. The bearing cones are clamped on the shaft by means of an end plate and cap screws which are locked by wiring the heads. The double cup for both bearings has a groove and oil holes through which the lubricant is supplied.





TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

How to learn more about bearings

Some of the engineering problems you'll face after graduation will involve bearing applications. If you'd like to learn more about this phase of engineering, we'll be glad to help. For a copy of the 270-page General Information Manual on Timken bearings, write today to The Timken Roller Bearing Company, Canton 6, Ohio. And don't forget to clip this page for future reference.

NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⓞ AND THRUST —ⓞ— LOADS OR ANY COMBINATION ✳

Let's face it, Pal . . .

Perhaps this editorial should be entitled, "The Trials and Tribulations of College Athletes" or, "How to be a Professional Amateur in One Easy Lesson." However, not wishing to shock anyone, I've used a more unobtrusive title.

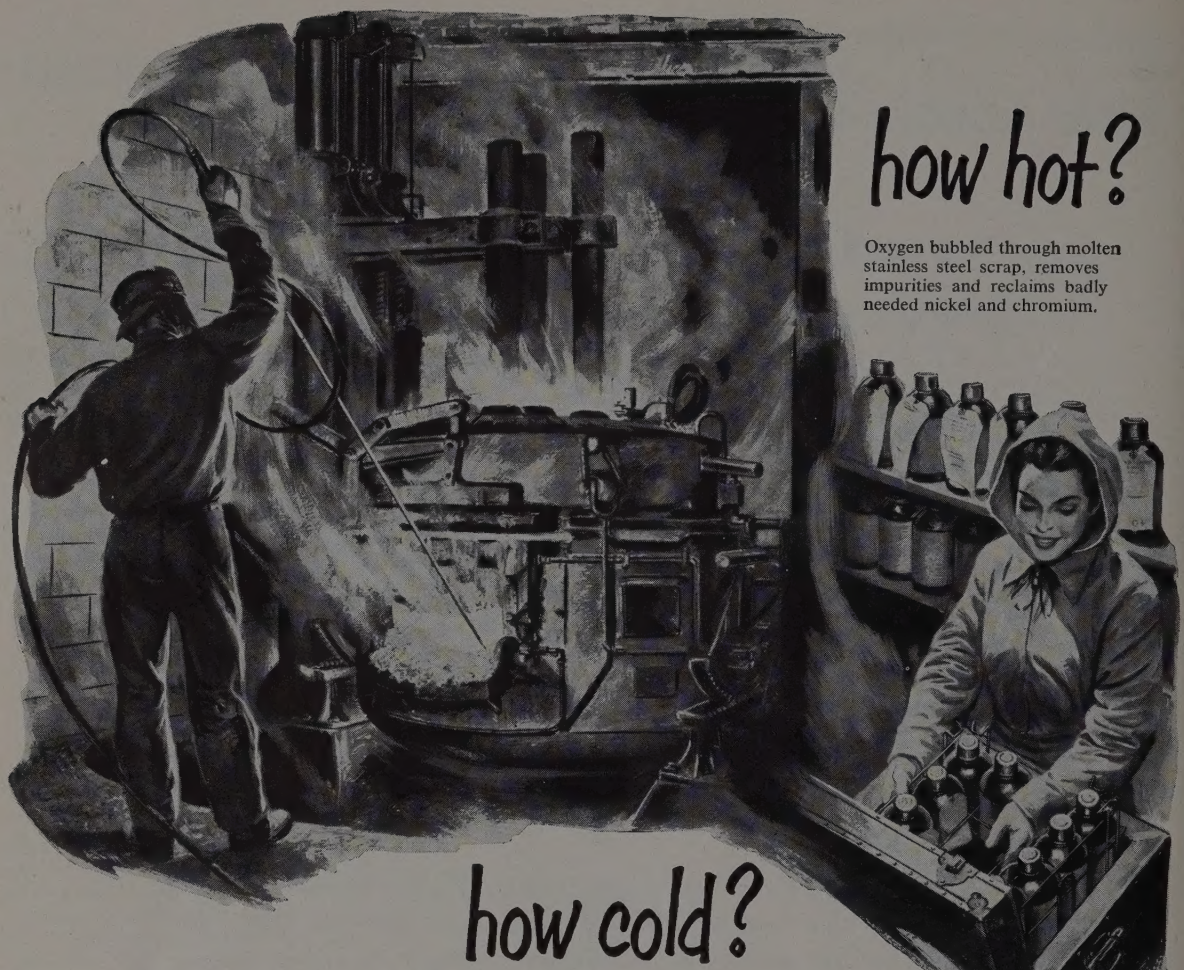
How can one become a professional amateur in one easy lesson? Easy! Just enroll in a sports-minded university. First, however, you must be an athlete and a GOOD one, at that. The rest is easy.

Does the University hand out large sums of money to prospective athletes to encourage them to enroll at Illinois? No—nothing as crude as that. They may give out athletic scholarships which cover tuition expenses, and then there are always constructive, worth-while jobs for needy athletes, like keeping the snow off the basketball floor.

Also, there are always loyal alumni. They're so happy to see GOOD athletes enroll at Illinois that they just can't help but aid them financially. They might help them out with some of their other expenses, and with the left-over change, the athletes may even have enough to buy a car.

Why does this situation exist? Everyone wants to have a team that they can be proud of—a team they can brag about. In fact, some people are so interested in having a good team, they're literally willing to pay for one. If they didn't resort to such measures, they'd lose their prize athletes to other schools where more lucrative gains were to be had. Consequently, the team would fold, certain individuals would lose their jobs, and all-in-all, things wouldn't have such a "rosy" future.

Let's face it, pal, if you want to watch an amateur team in action, you'd better go back to high school.—H.P.K.



how hot?

Oxygen bubbled through molten stainless steel scrap, removes impurities and reclaims badly needed nickel and chromium.

how cold?

"DRY ICE" (Solid CO_2 gas) refrigerates your blood donation to preserve its life-giving effectiveness during its flight overseas. This same gas also sparkles soft drinks, and helps keep food fresh.

AN AIR REDUCTION PRODUCT

at the frontiers of progress you'll find

It's a long step from reclaiming highly critical nickel and chromium to the refrigeration of whole blood – yet Air Reduction takes it in stride.

Why? Because Airco's business is the business of America – a corporate family that contributes to the basic activities of American life and industry – a corporate family that depends on each individual member for the techniques and knowledge to benefit industries as diverse as aircraft manufacture and food packaging . . . medical therapy and shipbuilding.

In fact, wherever progress is racing ahead, not inching to new frontiers, you'll find an *Air Reduction Product.*

AIRCO **AIR REDUCTION COMPANY, INCORPORATED**

Divisions of Air Reduction Company, Incorporated,

AIR REDUCTION SALES COMPANY, AIR REDUCTION PACIFIC COMPANY, AIR REDUCTION MAGNOLIA COMPANY . . . *Industrial Gases, Welding and Cutting Equipment* • AIRCO EQUIPMENT MANUFACTURING DIVISION • NATIONAL CARBIDE COMPANY . . . *Calcium Carbide* • OHIO CHEMICAL & SURGICAL EQUIPMENT COMPANY, OHIO CHEMICAL PACIFIC COMPANY . . . *Medical Gases – Apparatus – Hospital Equipment* • PURE CARBONIC COMPANY . . . *Carbonic Gas and "Dry-Ice"* • AIRCO COMPANY INTERNATIONAL . . . *Export* • AIR REDUCTION CHEMICAL COMPANY.

editorial staff

editor
Hank Kalapaca

associate editor
John Huber

assistant editors
Tom Tucker
Al Vejar

makeup editor
Paul Hutchinson

photography
Bruce Cook

assistants
Bob Schrader
Henry Spies
Howard Hadler
Tom Madden
Bob Quick
Peter Cattapan
Bob Dreshfield
Mel Rudich
George Ratz

navy pier representative
Warren Brandt

business staff

business manager
Dick Kenna

assistant managers
Eric Aagaard
Dwight Moberg
John Anderson

assistants
John Wilson
Ken Busche

navy pier representative
Gene Anderson

faculty advisers

G. R. Foster
R. W. Bohl
P. K. Hudson
O. Livermore

MEMBERS OF ENGINEERING COLLEGE MAGAZINES ASSOCIATED
Chairman: Prof. J. Paustian
University of Nebraska, Lincoln 8, Neb.
Arkansas Engineer, Cincinnati Cooperative Engineer, City College Vector, Colorado Engineer, Cornell Engineer, Denver Engineer, Drexel Technical Journal, Georgia Tech Engineer, Illinois Technograph, Iowa Engineer, Iowa Transit, Kansas Engineer, Kansas State Engineer, Kentucky Engineer, Louisiana State University Engineer, Manhattan Engineer, Marquette Engineer, Michigan Technic, Minnesota Technolog, Missouri Shamrock, Nebraska Blueprint, New York University Quadrangle, North Dakota Engineer, North Dakota State Engineer, Notre Dame Technical Review, Ohio State Engineer, Oklahoma State Engineer, Oregon State Technical Record, Penn State Engineer, Pennsylvania Triangle, Purdue Engineer, Rochester Indicator, Rose Technic, Wayne Engineer, and Wisconsin Engineer.

Published eight times during the year (October, November, December, January, February, March, April and May) by the Illini Publishing Company. Entered as second class matter, October 30, 1920, at the post office at Urbana, Illinois, under the Act of March 3, 1879. Office 213 Engineering Hall, Urbana, Illinois. Subscriptions $1.50 per year. Single copy 25 cents. Reprint rights reserved by *The Illinois Technograph.* Publisher's Representative—Littell Murray-Barnhill, 605 North Michigan Avenue, Chicago 11, Ill. 101 Park Avenue, New York 17, New York.

the illinois technograph

volume 67 number 4

contents:

editorial ---- 3

mechanical engineering department ---- 7

central foundry division ---- 8

1952 engineering open house ---- 10

navy pier ---- 12

AFS tour ---- 14

boneyard bilge ---- 16

skimming industrial headlines ---- 18

introducing ---- 20

our cover

Featured in this month's issue is the mechanical engineering department. One of the more common operations on the lathe is being performed in the machine tool laboratory.

our frontispiece

An insulation development engineer at the Westinghouse Electric Corporation's East Pittsburgh, Pa., plant uses a medical cystoscope to examine the insulation deep within the coils of a generator. A series of visual and electrical tests has been devised that determines the condition of the insulation on large, rotating electrical machinery. (Courtesy of Westinghouse)

he technograph features the . . .

Mechanical Engineering Department

by Tom E. Madden, m.e. '54

Few students today realize that the echanical engineering department here t the University of Illinois had its beinning in a mule stable. Established in 867 as a school of mechanical science nd art in the polytechnic department, t is the oldest department in the colege of engineering. Soon after its establishment, Mr. S. W. Robinson was appointed the first professor of mechanical ngineering and the Board of Trustees ranted $2,000 for the equipping of a mall wooden building, which had been sed as a mule stable, with the essenial tools to teach the new curriculum.

Professor Robinson and his small roup of students worked diligently in heir crowded classroom. One of the ruits of their labor, a ten horsepower team engine, is today on display as a nuseum piece in the mechanical engieering laboratory.

In 1871, the legislature appropriated unds for the construction of a twotory structure to be used as the M. E. uilding and drill hall. Later, Univerity Hall was built and the M. E. eartment carried on all of its work here with the exception of shop practice, which was still done in the previusly constructed dual purpose building. More than one-half of all male students nrolling in the rapidly growing Uniersity entered the college of engineerng. As a result, the need for increased ngineering facilities became acute and ed to the construction of Engineering Hall in 1893. The M. E. department vas given a large portion of the third loor of this building in which to maintain offices and hold classes. About the ame time, a power laboratory was started on the ground floor of the present Harker Hall.

Expansion of the M. E. department as continued to be rapid right up to he present day. In the interim between 895 and 1944, several small buildings nd portions of buildings were built or quipped for different phases of the deartment's activities. Among these were he machine tool laboratory, the mehanical engineering laboratory, and the econd floor of the transportation buildng. However, it was not until the comletion of the new, ultra-modern buildng in 1949 that the dream of the deartment came true, and all major funcions were united under one roof.

Today the M. E. department is the largest in the engineering college with an undergraduate enrollment of about 550 students and a faculty staff of nearly 100. In addition 26 men are currently working on their doctorates and 24 on their masters degrees. The department has indeed advanced a long way since the first classes were conducted in a converted mule stable.

TOM MADDEN

Tom, a sophomore in mechanical engineering, hails from Freeport, Ill. Since he is in the NROTC program, his plans for the future have been conveniently arranged for him.

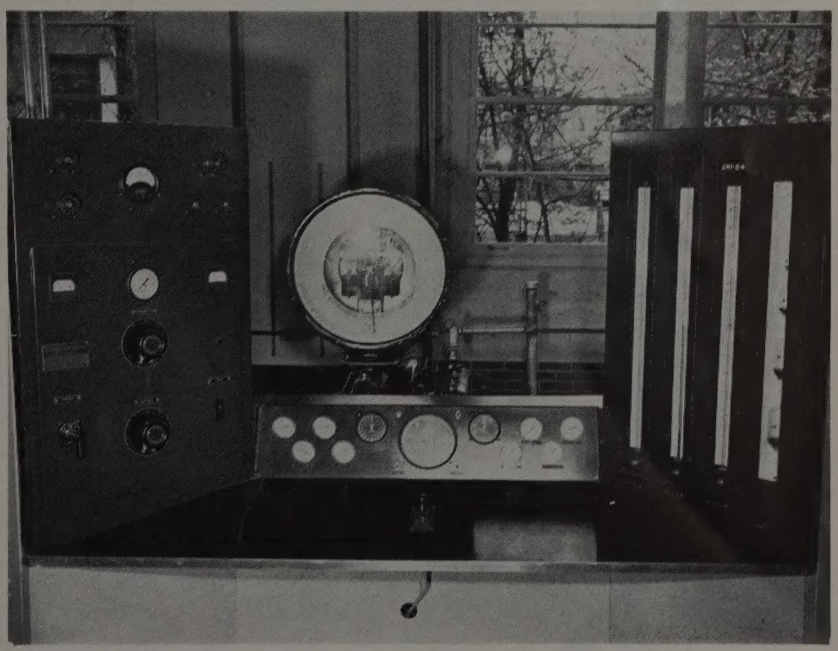
At Illinois, Tom is a member of Lambda Chi Alpha social fraternity and serves on the high school relations committee at the University YMCA.

His hobbies include working on radio sets and photography.

Aside from physical expansion, the M. E. department has greatly enlarged and improved its curriculum. The option system has been inaugurated so as to provide the student with a convenient means of placing emphasis on any one of the following phases: aeronautical, air conditioning and refrigeration, machine design, petroleum production, power, research, production, railway motive power, and general (which permits the student to select about 24 hours of either technical work cutting across the special options, or of non-technical electives in other colleges). Plans are now nearly completed for an additional option, which is, in effect, a new curriculum within the M. E. department. This new course of study leads to a degree in industrial engineering, a phase of engineering which is becoming more and more important every day.

A primary objective of the M. E. department is to provide the student with the best general education possible and at the same time not sacrifice any of the essential technical and scientific courses needed for graduation. This policy is in line with the views of men who are today far advanced in the engineering profession, and who have learned by experience that this type of education and character development

(*continued on page* 26)



A view of a test rack in the extensively equipped Internal Combustion Engine laboratory.

inside industry with Al Vejar . . .

Centra

General Motors Corporation

"General Motors" is almost a household word, but is more than the brand name of a series of products, for represents the cumulative assets and influences of a grea industry. This industrial empire encompasses more tha 100 manufacturing plants in 5 cities of the United State and is supplemented by assembly and manufacturing plant in 18 other countries.

The complexities of control imposed by such scope ne cessitate a functional subdivision and coordination of th whole which is comprised of individual productive element The organizational network of operating units, or division has been so contrived that each division is headed by a gen eral manager who is responsible for the operational effi ciency of his individual organization. Each division design and distributes its own products, hires and trains its own employees, handles its own personnel problems, develop and maintains its own executive staff and operating organ ization, purchases its own materials and equipment on competitive basis, and develops the manufacturing processe and methods best adapted to its particular needs an resources.

This criteria becomes more involved when we conside that some of the divisions are composed of a number o plants located in different parts of the country, which mus be coordinated by a group executive.

Though such a progression of control seems complex this organizational setup has the advantage of allowing oper ation without the limitations imposed upon small business and yet it eliminates many of the drawbacks of centralize big business. A great flexibility is inspired by the limitatio of size. The financial resources and staff facilities of th entire corporation integrally supporting the individual divi sion provide the solid base upon which high production ma be built.

Products and influences of this organization are to numerous to categorize, but one point should be emphasized The stimulative influence such an organization can hav upon the development of ability and initiative, through asso ciations, training, experience, and advancement is, unde niably, invaluable.

Central Foundry Division—An Evolution

The seed which has grown to such stalwart proportion was first planted in 1917, when the Saginaw Malleabl Iron Corporation was founded in Saginaw, Michigan. Thi company, which manufactured castings principally for th automotive field, was purchased by General Motors Cor poration in 1919 and became the Saginaw Malleable Iro Division of General Motors, operating as an individua unit.

oundry Division

General Motors Corporation

During the Second World War, shortages and vastly ncreased industrial demands caused the government to build ı malleable foundry to be operated by Saginaw Malleable ron division of General Motors Corporation. The location, Danville, Illinois, was decided upon because of a series of actors including the availability of manpower, rail acces- ability, housing, proximity to dependent plants, and the eed for decentralization of industry. Saginaw Malleable ron Division operated this plant in the manufacture of mal- eable castings for army trucks and tanks from its inception n 1944 until the cessation of hostilities and the termination f war contracts caused discontinuance of production. Gen- ral Motors then purchased this plant from the government nd reorganized the Saginaw Malleable Iron Division into Central Foundry Division of General Motors. The Dan- ille plant was reactivated and the Central Foundry trium- irate was completed with the construction of a plant in Defiance, Ohio.

When reopened in 1947, the Danville plant was solely quipped to produce grey iron castings. Most of the mal- eable iron equipment used during the war was not adapt- ble to peacetime industrial uses, as the wartime castings reviously made were of such large size and irregular type hat the equipment remaining was uneconomical and im- ractical for peacetime production. This lack of proper quipment necessitated the complete refitting of the plant. Automatic molding and conveying machines were installed hroughout. In 1948, additional plant expansion was carried ut when a malleable iron foundry equal in size to the grey ron plant was added. This growth has continued with the ddition of floorspace and equipment to the grey iron plant.

In reflecting, it is evident that there has been a remark- ble development within this plant. In the last five years, ts employment has enlarged from the original 250 to over ,000. This total will again increase when the next step f expansion is completed, for the capacity of the malleable ron plant is to be doubled by the fall of this year.

The expansion of Central Foundry cannot be solely ttributed to General Motors Corporation contracts. All astings necessary to General Motors, as a whole, are bid pon by the plants both independent of GM control and vithin the framework of the corporation. Likewise, the oundries of General Motors bid upon contracts outside the GM sphere. As an example, the Danville Central Foundry Division is now producing parts for Ford, Packard, and Bendix.

Defense contracts are on the upswing and the CFD is currently producing parts for a new *hydromatic* transmission or army trucks, designed to give a high rate of acceleration, nd a new test rocket casing for the Army Ordnance. Now, et's take a look at the plant as it is operating today.

Production—Plowshares and Swords

Central Foundry of Danville ranks high on the list of high-production foundries, and is generally acknowledged to be one of the cleanest, best equipped, and most efficient foundries in the world.

Integrally contained in the foundry building are a cafe- teria, medical department, the executive and personnel of- fices, a plant and processes engineering department, and the very necessary sand and iron testing laboratories. All opera-

(*continued on page 22*)

A pattern maintenance man repairs and inspects an exhaust manifold pattern. (Courtesy of GM).

the technograph tours the . . .

1952 Engineering Open House

by Bob Schrader, ch.e. '54 and John Schultz, cer.e. '52

(EDITOR'S NOTE: *This is the first of a series of three articles designed to acquaint you with the biennial Engineering Open House. This first article will deal with past engineering open houses and in particular, the* 1950 *Open House.*)

Already this year, while thoughts of Christmas past and finals yet to be are filling the heads of most students, engineering campus is humming with preparations for the 1952 Open House. During Open House, the engineering college and its associated branches throw open their doors to the general public for a weekend, showing them what is being accomplished in engineering at the U. of I. The Engineering Open House is not something new to the Illini campus, but instead is the result of a great tradition dating back almost to the turn of the century.

The Open House idea first started on the Illinois campus in 1906, when the physics department held an exhibit. This exhibit stressed "light, wireless telegraphy, and other electrical phenomena." Then in 1907, a drive started in the colleges to raise money for a memorial to Robert Fulton. In order to raise money for this memorial, the EE department put on a show very similar to the physics Open House of the year before.

The idea for an EE exhibit caught on, and these exhibits continued on up into the thirties. The EE shows were big productions, with much school support and a large attendance. For a while after the all-Engineering Open House started, the EE and Engineering Open Houses were held on alternate years. The ME department also held several open houses, with attendances ranging up to 5,000.

The first all-Engineering Open House was held on March 23, 1920, as part of a celebration commemorating the 100th birthday of James Witt. It was quite an ambitious project, with over 60 exhibits and a 20-page program for the show. Dr. L. P. Breckenridge, a professor of ME at Yale and one of the top men in the country in his field, was invited to speak. Another open house took place in 1921, and from then on open houses were a permanent fixture at Illinois. They were held either every two years or every four years until the war interrupted.

As the years went by, the Open House gained more prestige and a new name, the ISEE (Illinois Student Engineering Exhibition). By 1935, the ISEE had developed into the spectacle that it is today. But, as Dean Enger of the engineering college commented, it was not a stunt show, but actually a cultural course in engineering. He said, "The displays are designed to show, in a manner that a layman can understand, some of the basic principles on which the science of engineering is founded."

The 1939 ISEE carried on with the great tradition. Over 10,000 visitors descended on the campus for the weekend. They saw many exhibits which are still remembered. In the locomotive lab, a full-sized engine kept running at top speed without moving an inch. This giant was used in brake shoe research. A new metallurgy lab and an EE demonstration of television were also among the top exhibits of the day.

The war interrupted the presentati of the biennial Open House through drainage of engineering manpower. T first and only Engineering Exhibit sin the war was held on March 31-Ap 1 of 1950. The stress and strain of 35 student engineers culminated in an E gineer's Weekend that would ha brought pride to the soul of St. Pat hi self.

Stemming from the discovery of t Blarney Stone in the murky waters the mighty Boneyard, the activities co tinued with an accelerative pace throu the presentation of the parade of en neers' floats, the Open House itself, S Pat's Ball, and the dubbing of t Knights of the Order of St. Patric Interspersed throughout these activiti was the game of "Blarney, Blarne Who's Got the Blarney Stone?" thievery played a repetitive role in t life of that sacred article.

The Open House was a reservoir engineering ingenuity. Exhibits by t various departments and honorari showed many facets of mechanized i dustry. The structure and operation automobiles and jet-engine airplan were disclosed and explained. The wi tunnel of the aeronautical engineers w exhibited in actual operation. An i pressive test of the breaking of a co crete cylinder by Talbot Lab's 3,00 000 *lb* hydraulic testing machine w shown. Brick making machines, tele sion sets, rock crushing machines, G ger counters, and traffic counters we among the variety of projects shown operation.

Among the audience participation e hibits were the driver reaction mete strength tester, and a lie detector. "kissometer" was on hand to give ra ings of an individual's osculation abilit (The records are not clear on wheth a suitable partner was on hand to ass in this measurement).

The wonders of scientific technolo were displayed in such mystifying e hibits as the floating dishpan, which w suspended in mid-air with no visib means of support; the ghost writer, which electrons were harnessed to spe out words; the theremin, which em ted musical tones at the approach the operator's hands; water boiling a paper cup; and the color organ, whi

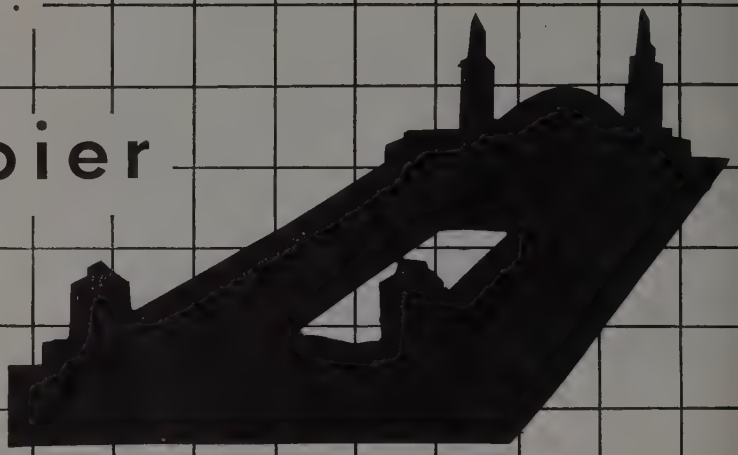
(*continued on page* 32)

Left: Dean Everitt displays the much sought after Blarney Stone.

Above: The IAS prize-winning float. Right: Frankie Master's orchestra provided the music for the 1951 St. Pat's Ball.

— *the university of illinois at . . .*

navy pier



by Warren H. Brandt, c.e. '54

Harvard on the rocks

The week of December 3-7 was an eventful one for Pier engineering and architecture students, with a host of celebrities that would turn a TV emcee to shame.

On Wednesday afternoon Pier architects were treated to a three-hour symposium on Dymaxion philosophy, presented under the auspices of the American Institute of Architects and featuring R. Buckminster Fuller, mathematician, architect, designer and philosopher.

Fuller's philosophy, that of treating a problem as a whole, or looking at all aspects of a situation, enthralled many who heard it, including this editor. The passage of time went unnoticed as this genial man expounded his ideas on the economics of construction and the relation of design to economics.

Those receiving awards and their respective activities are, kneeling left to right: Robert Brittain, AIA; James H. Trail, ASCE; AIEE sponsor W. K. LeBold; Miss Frances Watkins, AIEE and Engineering Council chairman; Ronald Kowalik, AIEE; Charles Kersch, AIEE. Standing, left to right: ASCE sponsor J. C. Chaderton; Dean F. W. Trezise, College of Engineering UIC; IAS sponsor George J. Zanotti; Phillip De Protine, IAS; ASME sponsor J. S. Kozacka; Warren Brandt, ASCE and TECHNOGRAPH; William Kahan, ASCE; Oliver Smith, ASME; Jack Margolis, AIEE; Harry Rogers, ASME; Frank Pease, AIEE; TECHNOGRAPH sponsor Ogden Livermore and AIA sponsor H. B. McEldowney.

Wednesday evening was occupie with the first annual Engineering So cieties Council dinner, with Associat Dean of engineering F. W. Trezise a master of ceremonies.

Guest of honor and principal speak er was Ovid W. Eshbach, dean of en gineering of Northwestern Technolog cal Institute. His theme was "Th Curses and Virtues of Engineering Con vention." The 300 engineers presen warmly applauded Dean Eshbach as h urged them to be loyal to their profes sion, their school, and to themselves.

Extending greetings from the Urban campus was Harvey Jordan, associat dean of engineering who welcomed Pie engineers to visit classrooms and labora tories downstate.

Also present from Urbana were fou members of the *Technograph* staff in cluding editor Hank Kalapaca and fac ulty adviser R. W. Bohl.

Editor Kalapaca outlined the scop of the *Technograph's* field of endeavor its place as the outstanding engineerin magazine of the school and possibilitie for the development of journalistic abil ities by students who might be inter ested in joining its staff.

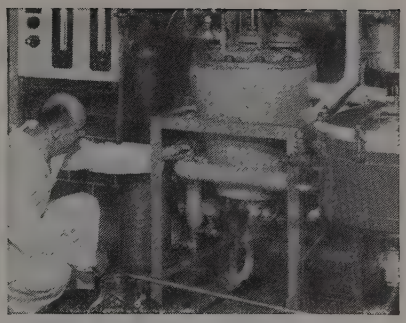
The festivities of the evening close with the presentation of Certificates o Merit to students in the college of en gineering who had done outstandin work in the different engineering so cieties.

Recipients of awards were the fol lowing:

In the American Society of Civil En gineers—Warren H. Brandt, William Kahan and James H. Trail.

In the American Institute of Archi tects—Warren Anderson and Rober Brittain. (*continued on page* 30)

THE DU PONT DIGEST

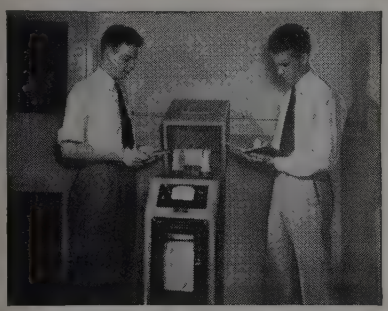


CHEMICAL *engineers supervise preparation of larger-than-laboratory batches of chemicals in Du Pont's Special Service Laboratory.*

Ch. E's at Du Pont

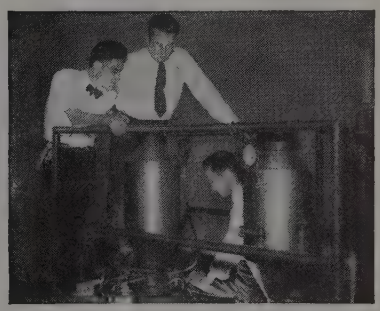
[FIRST OF A SERIES]

New products mean new opportunities for chemical engineers



STUDYING *"Teflon" tetrafluoroethylene resin insulating material with special apparatus: K. F. Richards, B.S.Ch.E., Cornell '48; and E. K. Holden, M.S.Ch.E., Delaware '48.*

CHECKING *a multi-stage carbon-monoxide compressor used in semi-works operations: R. L. Stearns, B.S.Ch.E., Yale '49; and H. Peterson, B.S.Ch.E., Northeastern University '42.*



CHARGING *experimental polymers to spinning machine: O. C. Wetmore, Ph.D.Phys.Ch., New York U. '44; D. A. Smith, B.S.M.E., Purdue '40; and C. O. King, Sc.D.Ch.E., Michigan '43.*

To you as a student chemical engineer, what does this statement bring to mind:

> **Nearly two-thirds of Du Pont's current sales are in products entirely or virtually unknown in 1930.**

Likely it suggests years of solving intriguing engineering problems, the designing of unique equipment, the carrying out of reactions under extraordinary conditions.

But it should also suggest the opportunities that will come to chemical engineers in the future. For at Du Pont, new and better products are continually being developed. From today's extended program of fundamental research you can expect more neoprenes, more nylons, more plastics like "Teflon" tetrafluoroethylene resin.

As these products come out of the laboratory, they will bring with them a succession of interesting and challenging problems for the chemical engineer. Problems that will arise out of their very newness.

For instance, take nylon, the first wholly synthetic organic fiber. In working out techniques for its commercial manufacture, there was practically nothing to go on. The compounds of which it was made, hexamethylenediamine and adipic acid, were essentially laboratory chemicals. Processes had to be devised to make them from cheap raw materials—benzene, hydrogen, air and ammonia. Large-scale preparation of nylon salt from amine and acid required going beyond the classical unit operations.

Here for the first time it was proposed to extrude a fiber with extreme accuracy from a melted polymer at 290°C. At this temperature the polymer decomposes slowly. It had to be melted, pumped at 5000 p.s.i. pressure through microscopic holes and cooled in a hurry. Otherwise the fiber would emerge discolored.

The Du Pont chemical and mechanical engineers and other men and women who worked with them ran into one difficulty after another. More than once they thought that the project would have to be abandoned.

However, it is basic in Du Pont people's philosophy not only to take on difficult pioneering problems, but to see them through. With nylon, this persistence paid off handsomely.

Is this the kind of problem *you'd* like to attack, the kind of people *you'd* like to work with?

NEXT MONTH — Opportunities for chemical engineers in research and development will be discussed in the second article in this series. Watch for it!

WRITE FOR *40-page booklet, "The Du Pont Company and the College Graduate." Address: 2521 Nemours Building, Wilmington, Del.*

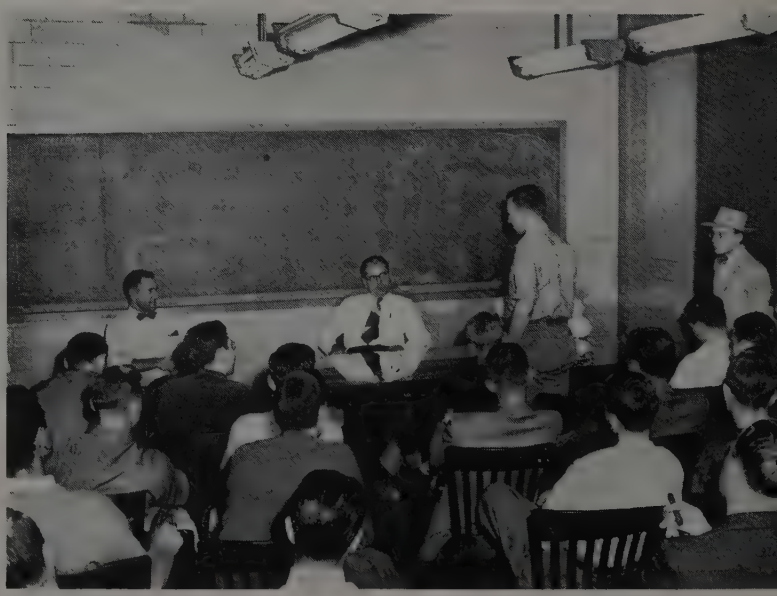
DU PONT
REG. U. S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

Entertaining, Informative — Listen to "Cavalcade of America," Tuesday Nights, NBC Coast to Coast

Central Foundry Division

General Motors Corporation

Left: The tour was supplemented with an invitation to dinner in the modern cafeteria which is an integral part of the foundry. Standing in center rear are Plant Manager Martin and Grey Iron Supt. Drury. Jim Leach, A.F.S. adviser is seated behind Drury.



Right: Left to right facing camera: Charles Drury, Grey Iron Superintendent; Tom Cavanaugh, Personnel Manager; A. L. Andrews, student; Dick Martin, Plant Manager, and A. C. Degner, student.

CONFERENCE IN THE CLOUDS

Among the undergraduates on any college campus, you'll find the talk reaching up to the clouds. And once in a while — in a classroom, around a study table, or even in a bull session — a really big idea is born.

Big ideas come, too, from the men and women in laboratories, business offices, shops. But often these professionals are exploring a path first glimpsed in college.

How do we know? Because of the many college people who have come into the Bell System, where big ideas and a lot of dreams have taken their place in progress. The human voice, carried along a wire, first across a town, then a state, a nation, and now the world. Music and pictures and things happening delivered into cities and hamlets all across the land by radio and television networks.

We're always looking for the men and women who get big ideas — whether they're about people, or machines, or ways of doing things. It's the only way the Bell System can keep on giving this country the best telephone service in the world.

BELL TELEPHONE SYSTEM

by Bob Schrader, ch.e. '54

One of the real gems of literature of our time was recently published by *The Benchmark,* official publication of Chi Epsilon, honorary civil engineering fraternity. It is entitled:

THE ENGINEER

Verily, I say unto you, marry not an engineer for the engineer is a strange being possessed of many devils: yea, he speaketh eternally in parables, which he calleth "formulas," and he wieldeth a a big stick which he calleth a slide rule, and he hath but one Bible—a handbook.

He talketh always of stresses and strains, and without end of thermodynamics. He showeth always a serious aspect and seemeth not to know how to smile; and he picketh his seat in the car by the springs therein and not by the damsel beside him; neither does he know a waterfall except for its power, nor the sunset except for its specific heat.

Always he carrieth his books with him, and he entertaineth his maiden with steam tables. Verily, though his damsel expecteth chocolates, when he calleth he openeth the packages to disclose samples of iron.

Yea, he holdeth his damsel's hand, but only to measure the friction, and kisses but to test viscosity. For in his eyes shineth a far-away look which is neither love nor longing—but a vain attempt to recall a formula.

There is but one key dear to his heart, and that is the Tau Beta Pi key; and one love letter for which he yearneth, and that an "A"; and when to his damsel he writeth of love and signeth with crosses, mistake not these symbols for kisses, but rather for unknown quantities.

Even as a young boy he pulleth a girl's hair to test its elasticity, but as a man he discovers different devices; for he would count the vibrations of her heart strings and reckon her strength of materials; for he seeketh ever to pursue the scientific investigations, and inscribeth his passion in a formula; and his marriage is a simultaneous equation involving two unknowns and yielding diverse answers.

* * *

A demure young thing walked into a furniture store to buy a piece of furniture for her apartment. "I can't make my mind up. I don't know if I want an arm chair or a davenport."

Said the salesman, "You can't make a mistake with an arm chair. Because when—*the rest of this joke is censored.* For the punch line send a self-addressed stamped envelope to *The Illinois Technograph,* Civil Engineering Hall, University of Illinois.

* * *

POET'S CORNER(?)

I serve a purpose in this school—
On which no man can frown—
I quietly sit alone in class
And keep the average down.

* * *

Sing a song of sulfides,
A beaker full of lime,
Four and twenty test tubes
Breaking all the time.
When the cork is taken out,
The fumes begin to reek.
Now isn't that an awful mess
To have five times a week?

* * *

Little Jack Horner
Sat in a corner,
Crib notes under his eye.
He opened his book,
Took a quick look,
And now he's Tau Beta Pi.

* * *

VISIT THE '52 OPEN HOUSE

* * *

An EE professor was explaining a fundamental concept of electricity. "Let's take a positive charge and put it in Talbot Lab. Then let's take a negative charge and place it in the Law Building. Come to think of it, what the hell's a negative charge doing in the Law Building?"

A patient at a mental hospital who had been certified cured was saying goodbye to the head psychiatrist.

"And what are you going to do when you get out into the world?" asked the doctor.

"Well, I may go back to Illinois and finish my engineering course. Then, I liked the Army, so I may enlist again."

He paused a moment and thought, "Then, again, I may be a teakettle."

* * *

The moon was yellow,
The lane was bright,
She turned to me
In the autumn light.
And with every glance
She gave a hint
That what she craved
Was real romance.
I stammered, stuttered,
And time went by.
The moon was yellow
. . . And so was I.

* * *

Dr. Ehrensperger: "Are you sure that this story is original?"

Student: "Absolutely, sir."

Dr. Ehrensperger: "To think I should ever have the pleasure of meeting Rudyard Kipling in person!"

* * *

"Whoever told that guy he was a prof? He just doesn't know how to teach the stuff. Everybody hates him. Every time he tries to explain something he digresses so much that no one can understand what he's talking about. I think he ought to quit teaching and go back to the farm."

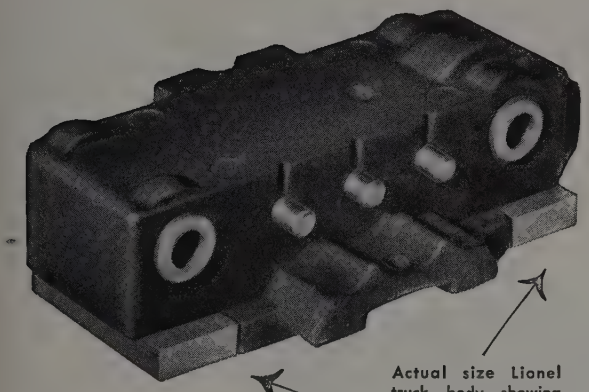
"Yeah, I flunked, too."

* * *

There was a young girl from
St. Bride's
Who ate green applies and died
Within the lamented
The apples fermented
Making cider insider insides.

What's Happening at CRUCIBLE

about permanent alnico magnets



Actual size Lionel truck body showing two Crucible alnico bar magnets in place.

Lionel uses Crucible Alnico in new locomotive design

The Lionel Corporation, big name electrical toy manufacturer, has pioneered in the design of miniature locomotives for table-top railroading. One of the principal aims of this design is to achieve the highest possible degree of adhesion between the driving wheels and the track.

Lionel experimented with a conventional method of increasing the traction (i.e. load up the driving axles with ballast weights) . . . and then turned to magnetic materials.

Crucible alnico specialists were called in. Working in close cooperation with Lionel engineers, the Lionel "Magne-Traction" locomotive was born. As the name implies, "Magne-Traction" utilizes magnetic attraction between powerful Crucible alnico bar magnets placed in close proximity with the wheels.

By varying the number and strength of the magnets, almost any desired degree of adhesion can be obtained. In laboratory tests a light-weight plastic "Scout" locomotive whose normal train load is 4 cars, was able, after installation of proper magnets, to pull a train of 24 cars, an improvement of 600%. A heavy miniature locomotive

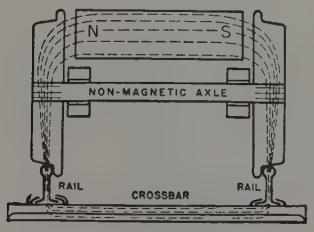


Diagram shows how magnetizing force is supplied by external stationary Crucible permanent magnet and non-magnetic axle. Wheels are sintered steel.

pulled 28 cars instead of its usual load of 7 cars. Then too, locomotives unable to start a normal 4 or 5 car train on greater than 1 degree slope were able with the special magnet assembly to pull them from a dead start up a 5° slope, while the new twin-motor Lionel Pennsy GG-1 scooted up a 15° slope (i.e. 37% grade) without any apparent difficulty.

Crucible's part was twofold. Not only were Crucible metallurgists and engineers active in the initial design, but Crucible production experts precision cast these bar magnets using plastic patterns. This is an innovation in alnico magnet mass production. Commonly, alnico is made in sand molds, and usually requires a great deal of finishing, but with precision-cast alnico magnets expensive machining is cut to a minimum.

Engineering Service Available

Your permanent magnet problem will receive the same experienced consideration from Crucible's unsurpassed staff of metallurgists and production specialists. Please give full details. Crucible Steel Company of America, General Sales Offices, Oliver Building, Pittsburgh, Pa.

CRUCIBLE first name in special purpose steels

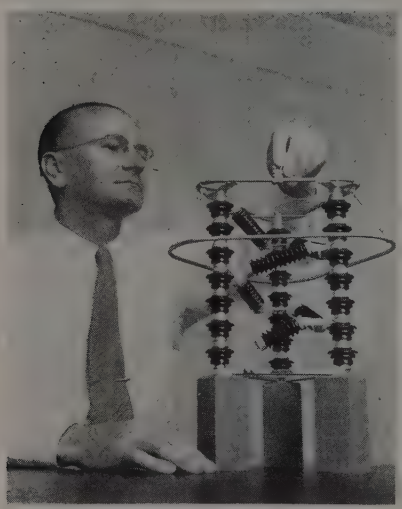
52 *years of* *Fine* *steelmaking*

Midland Works, Midland, Pa. • Spaulding Works, Harrison, N. J. • Park Works, Pittsburgh, Pa. • Spring Works, Pittsburgh, Pa.
National Drawn Works, East Liverpool, Ohio • Sanderson-Halcomb Works, Syracuse, N. Y. • Trent Tube Company, East Troy, Wisconsin

skimming industrial headlines

edited by Howie Hadler, ag.e. '54

spiral lighting arrester



Shown here is a model of a new high-voltage lightning arrester with its designer, A. M. Opsahl of Westinghouse. Only half as tall as former high-voltage arresters that required large structural steel supports, the new type SV station type arrester features a zig-zag arrangement of the arrester units that eliminates the need for such supports. Lightning surges are carried groundward through a series of arrester units that spiral down between the three vertical columns. For use on 230-kv lines, the arrester stands ten feet high, and is more efficient, less costly to install, and more easily maintained than previous designs of high-voltage arresters.

lights for Lyndonville

Lyndonville, Vermont, a Green Mountain ski resort town, has established itself as the only town in the country with a fluorescent-lighted main street.

Each of the new units, of which there are ten, contains four lamps, and has a total output of 22,000 lumens. The big (8 *ft*) fluorescent lamps will give a brighter and more diffused light than the globe fixtures which they replace.

The installation is made on aluminum poles 30 *ft* high, in a staggered arrangement calculated to provide an average illumination of one foot-candle.

So effective are the fluorescents in lighting the center of the town, that officials of the community plan to hold their famous sled dog races right down the main street this winter.

plastic blowers for A-C motors

Plastics has found another use in the electric motor field, where it is now being used to replace critical aluminum and bronze for blowers in small, totally-enclosed, fan-cooled a-c motors. The plastic blowers consist of a polyester resin reinforced with glass fibers. Glass fiber reinforcement has been found to be superior to organic fiber reinforcement because of increased resistance to chemical attack, and increased strength per pound.

The plastic blower has many advantages over the aluminum and bronze blowers it replaces. It is desirable on motors used in refineries, chemical plants, and process industries where corrosive atmospheres may be present, since it is unaffected by the chemical agents that attack the metal blowers.

The plastic blower is as much as one third lighter in weight than its metal counterparts. While this may be only a few ounces, the reduction of inertia where frequent, rapid reversals is required is worthwhile. Preliminary tests indicate that the plastic blower has better resistance to abrasion than its predecessors. All these advantages are obtained without sacrifice in blower performance. The new type blower has successfully passed over speed tests at four times normal speed.

cleaning by sound

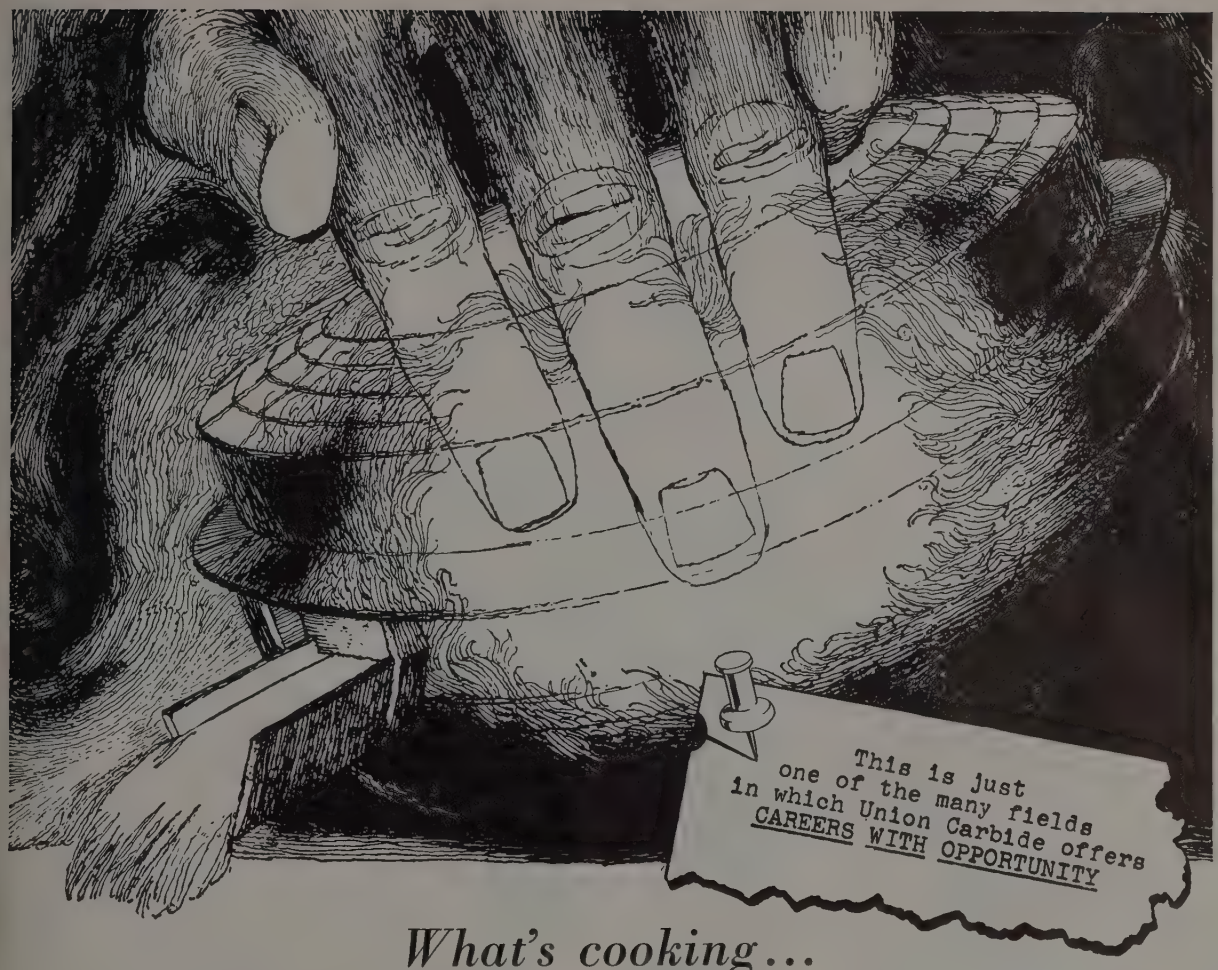
Sound pitched so high that it cannot be heard is now being used, for what is believed to be the first time, in industrial cleaning on a production line basis.

By means of an ultrasonic cleaning machine, high-pitched sound waves directed through a liquid solvent silently remove metal particles, lapping compound, oil and grease from tiny openings and corners of electric shaver heads.

The device was developed by GE and is now in use by Schick Incorporated, manufacturers of electric shavers.

Cleaning of the tiny openings in shaver heads has long been a major problem in the electric shaver industry, previous methods requiring long, tedious operations. Special compounds used in grinding, as well as metal particles resulting from grinding, become lodged in the small corners and capillary spaces of shaver heads, making cleaning difficult.

Plastic blowers for use on small fan-cooled a-c motors shown with older type aluminum and bronze blowers which they are replacing. (Courtesy of Westinghouse)



What's cooking...

From the raging heat of this furnace come basic materials for your stainless steel kitchenware, plastic shower curtains, and man-made textiles

What's cooking in the seething, roaring fire of this electric arc furnace?

The fingers? No! They represent what's doing the cooking.

WHITE-HOT INFERNO—In the actual furnace the fingers are giant rods of carbon or graphite, called electrodes, that carry the heat-creating electricity. Carbon and graphite are the only materials that can do this and stand up under the terrific temperatures of 6,000 degrees or more.

In carbon arc furnaces, alloy metals used in producing stainless steel are separated from their ores. Similar furnaces are used to make other tough and hard varieties of fine steels for automobiles, airplanes and many other familiar products.

SERVES YOU MANY WAYS—But steel making is only one important way in which carbon and graphite serve you. Motion picture screens are illuminated by the brilliant light of the carbon arc. Calcium carbide, the source of many modern plastics, textiles and chemicals is an electric furnace product. Without carbon we wouldn't have dependable, long-life dry batteries for flashlights, radios and hearing aids.

WORK OF UCC—Creating carbon and graphite products for an almost endless number of uses is one of the many accomplishments of the people of Union Carbide.

STUDENTS and STUDENT ADVISERS

Learn more about the many fields in which Union Carbide offers career opportunities. Write for the free illustrated booklet "Products and Processes" which describes the various activities of UCC in the fields of ALLOYS, CARBONS, CHEMICALS, GASES, and PLASTICS. *Ask for booklet N-2.*

UNION CARBIDE
AND CARBON CORPORATION
30 EAST 42ND STREET UCC NEW YORK 17, N. Y.

UCC's Trade-marked Products of Alloys, Carbons, Chemicals, Gases, and Plastics include

NATIONAL Carbons • ACHESON Electrodes • ELECTROMET Alloys and Metals • HAYNES STELLITE Alloys
PREST-O-LITE Acetylene • LINDE Oxygen • PYROFAX Gas • SYNTHETIC ORGANIC CHEMICALS
EVEREADY Flashlights and Batteries • PRESTONE and TREK Anti-Freezes • BAKELITE, KRENE, and VINYLITE Plastics

introducing . . .

by Tom Tucker, ch.e. '53 and Bob Dreshfield, met.e. '55

BILL SODERSTROM

Bill Soderstrom, who graduated from high school in Grand Junction, Colorado, was born in 1927 in Rapid City, South Dakota. He moved to Grand Junction at the age of three, where he has resided since.

Bill is studying ceramic engineering, although he spent two years with the Navy as a radio technician and sonar

BILL SODERSTROM

instructor. He attributes his interest in ceramics to the fact that he worked for the Grand Junction Brick Company for several years.

Bill spends most of his spare time working for the Illio, for which he is assistant editor. He got his start in college publications writing for the *Tech*.

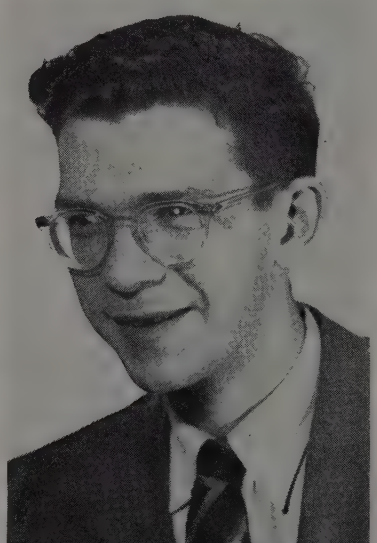
This busy gentleman also finds time to be president of his social fraternity, Phi Kappa Sigma. He is treasurer of Keramos and a member of Tau Beta Pi, Tomahawk, Student Chapter American Ceramic Society and recently attended the "100" Banquet for the top one hundred seniors in activities.

After graduation in June, 1952, Bill will return to Grand Junction, Colorado, where he has a job awaiting him as a ceramic engineer with the Grand Junction Brick Company.

ROBERT W. BOHL

Robert W. Bohl, assistant professor of metallurgical engineering, was mined in Peoria in 1925. Preliminary treatment of the ore was carried out at Peoria-Woodruff high school. For one year, refining was carried on at Bradley university. However, the job was then transferred to the University of Illinois. In 1940, the University considered the product worthy of the degree of Bachelor of Science.

After receiving his degree, Mr. Bohl joined the staff of the U. of I. and has remained ever since. Three of his summers have been spent in the Caterpillar research laboratory studying aluminum piston alloys. In 1949, the University conferred both a masters degree and



ROBERT W. BOHL

an assistant professorship on him. At present, he has passed the preliminaries for his Ph.D., but has not finished the research.

This past semester, Mr. Bohl taught ferrous metallography, non-ferrous metalography, ferrous process metallurgy, and mechanical metallurgy. He states that he likes teaching at the University very much. He is also a member of the policy and development committee of the college of engineering.

Mr. Bohl was married in 1947 and at present has one daughter, 18 months old.

This fall he wrote an article for the *Welding Journal* with some members of the department of civil engineering.

As an undergraduate, Mr. Bohl was a business manager of the *Technograph*. His name has reappeared on the masthead this year. He now is a faculty adviser.

While attending the University, Professor Bohl gained entrance to Tau Beta Pi, Sigma Tau, Alpha Sigma Mu, Phi Kappa Phi, Sigma Xi, and a mathematics honorary.

For relaxation, Mr. Bohl likes to watch basketball and football, and to play handball and tennis. Another hobby is photography. This latter ties in well with work in a metallurgy laboratory, according to him. He also puts out a newsletter to the alumni of the metallurgy department.

"I'm sorry to disappoint you, Charles, but I can't go out with you tomorrow. I became engaged to Dick last night."

"Oh, well, how about next week?"

* * *

Little Jerry came down the stairs bellowing lustily. "What's the matter now?" said his mother.

"Papa was hanging pictures and he just hit his thumb with the hammer," said Jerry.

"That's not so serious," soothed his mother. "A big man like you shouldn't cry at a trifle like that. Why didn't you laugh?"

"I did," sobbed Jerry.

* * *

A conductor fears no one—he tells 'em where to get off.

* * *

"Mmmmmm.I guess I've lost another pupil," said the professor as his glass eye rolled down the sink.

* * *

The one ring circus was visiting a town in the hills. The folks there recognized all the instruments of the band except the slide trombone.

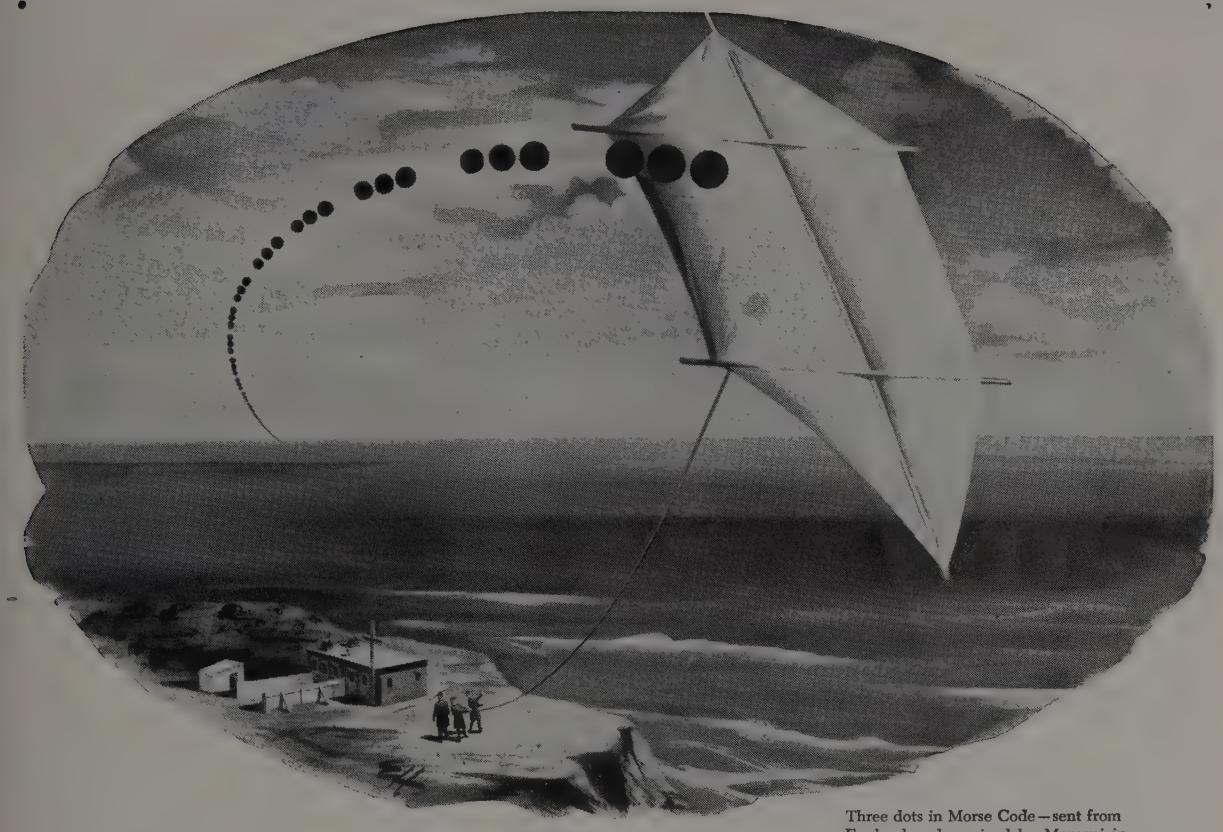
One old settler watched the player for quite some time, then, turning to his son, said, "Don't let on that you're watching him. There's a trick to it; he ain't really swallerin' it."

* * *

The landlady was showing a prospective tenant a room. "I think that I ought to tell you," she said, "that the former occupant of this room was a Professor Steinway—an inventor."

The man stood silent for a moment, then, noticing a rather large stain on the ceiling, he remarked: "One of the professor's experiments?"

"Heavens, no!" exclaimed the landlady. "That's the professor."



Three dots in Morse Code—sent from England and received by Marconi in Newfoundland—proved that wireless signals could span the Atlantic.

Three dots that opened a new era!

When Marconi, on December 12, 1901, heard a "3-dot" radio signal—the letter "S" in Morse Code—across 1,800 miles of sea, it was an experimental triumph that opened a new era in communications.

Before this historic event, wireless telegraphy had been limited primarily to communications between the shore and ships at sea. Marconi's success, however, was the forerunner of many other developments which led eventually to RCA world-wide radiotelegraph service that now operates more than 80 direct circuits to 67 countries.

As radio progressed, its usefulness was expanded by invention and development of the electron tube, the harnessing of short waves which made world-wide transmission a reality, and the automatic transmission and reception of messages at high speed.

Radio, with its magic of spoken words and music broadcast over the world . . . *television,* the miracle of pictures in motion transmitted through the air . . . these mediums of modern communications have added notable links in the chain of electronic advances first forged in 1901 from the mere sound of three dots.

* * *

See the latest wonders in radio, television, and electronics at RCA Exhibition Hall, 36 W. 49th St., N. Y. Admission is free. Radio Corporation of America, RCA Building, Radio City, New York 20, N. Y.

Continue your education with pay—at RCA

Graduate Electrical Engineers: RCA Victor—one of the world's foremost manufacturers of radio and electronic products—offers you opportunity to gain valuable, well-rounded training and experience at a good salary with opportunities for advancement. Here are only five of the many projects which offer unusual promise:

- Development and design of radio receivers (including broadcast, short-wave and FM circuits, television, and phonograph combinations).
- Advanced development and design of AM and FM broadcast transmitters, R-F induction heating, mobile communications equipment, relay systems.
- Design of component parts such as coils, loudspeakers, capacitors.
- Development and design of new recording and producing methods.
- Design of receiving, power, cathode ray, gas and photo tubes.

Write today to College Relations Division, RCA Victor, Camden, New Jersey.
Also many opportunities for Mechanical and Chemical Engineers and Physicists.

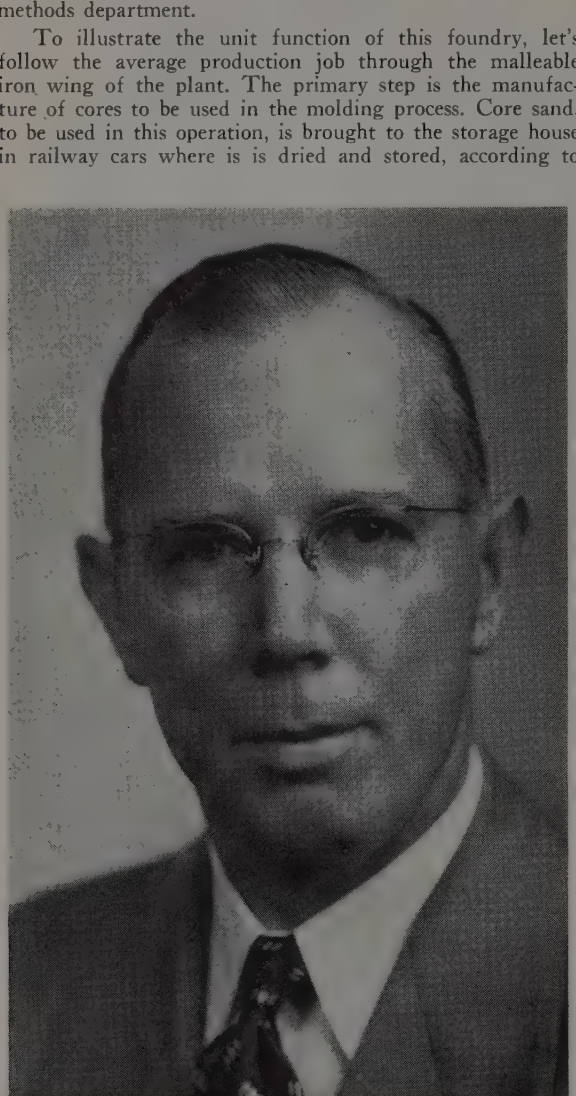
RCA **RADIO CORPORATION of AMERICA**
World Leader in Radio — First in Television

CENTRAL FOUNDRY . . .

(*continued from page* 9)

tions in the foundry have been carefully engineered by the methods department.

To illustrate the unit function of this foundry, let's follow the average production job through the malleable iron wing of the plant. The primary step is the manufacture of cores to be used in the molding process. Core sand, to be used in this operation, is brought to the storage house in railway cars where is is dried and stored, according to



Mr. Dick Martin, recently appointed Plant Manager, now holds full responsibility for the operation of the Danville Plant.

specification, until it is needed within the system. From the storage house, the sand enters the core room by an overhead belt and is automatically weighed into the mullers. Near the mullers, dry ingredients, including corn flour and bentonite, are weighed on a small batch scale and, with oil and water, are metered into the mullers. The moist mixture is prepared in mullers with automatic timing devices. When the mixing cycle is completed, the prepared mixture is conveyed by continuous belts and an elevator to the second floor storage bins from which gasoline powered wheelbarrows take their loads of core mix to feed the hoppers above the core machines. To avoid piping stoppages, vibrating feeders are used on these hoppers.

Automatic core blowing machines are used, and are of three different sizes to facilitate the desired flexibility in production. A roll-over machine is also used. After the machines, fed from the hoppers above, have filled the permanent metal core boxes, the cores are switched to the driers and put on the oven conveyer rack. The cores then pass into the oven and are baked at a temperature of 450 to 500°F for a period of approximately one hour. After baking, the conveyor progresses to the "dry side" of the core room where the cores are inspected and processed.

A special unit is provided for the preparation of the molding sand. In this unit, sand from the shakeout has moisture, new sand, sea coal, and a bonding agent added to the desired proportions. The mix is mulled and delivered by overhead belt system to the tempering bins. Molding sand is then delivered to the molding machines as needed by an overhead belt system.

In dominance are jolt squeeze type molding machines. The assembly line technique is utilized effectively here. As a continuous conveyor containing empty flasks passes the line of molding machines, the operator of the machine removes the flask and swings it onto his molding machine where the flask is charged and the drag made. The flask is then replaced upon the conveyor with a crane. This operation takes place at the drag station. Core setters then place the cores in the drag portion of the mold as it progresses along the conveyor. At the cope station, the cope is made upon a molding machine and placed by means of a crane upon the drag portion of the mold. The mold now need only be aligned and clamped and it is ready for pouring. A continuous conveyor transfers the completed mold to the pouring area.

Thus far, the operations in both grey and malleable iron sections have been very similar, but here the differentiation begins.

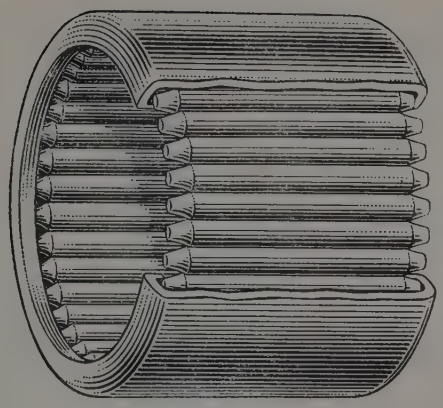
Malleable Iron Castings

First, let's complete the malleable iron cycle. The melt must now be readied for pouring. Ingredients, as predetermined by experience based upon test laboratory data, are carried to the charging floor of the cupola; the scrap steel, sprue, and pig iron being retrieved from the outside storage area by cranes equipped with electromagnets.

Men weigh the ingredients comprising the charge, and then dump them through the charging door from hand trucks. The white iron melt is tapped from the forehearth of the cupola and transferred to an electric arc furnace where chemical and physical properties can be checked and controlled an the temperature increased. From the electric furnace, a large monorail delivery ladle transfers the melt to the pourers who run their swivel ladles on a monorail parallel to the mold conveyor. The conveyor system then leads to the shakeout where castings are removed from the molds and placed into cooling buckets which traverse the width of the foundry on an overhead conveyor system. The semi-cool castings are dumped on a sorting belt where they are separated into bins on an inclined slide. At this point, obviously, faulty castings are allowed to pass on to the scrap pile.

The white iron castings then go down a slide where chipping is done to ready them for the annealing oven. When chipped, the castings are transferred to trays and sent to their 35 to 40 hour run in the annealing oven. Here the white iron is transformed from free cementite in a matrix of pearlite to temper carbon in a matrix of ferrite, which is malleable iron. Upon removal from the annealing oven the malleable iron castings are cleaned in a shotblast cabinet and further processed. This final processing may

(*continued on page* 24)



This is a Torrington Needle Bearing

Designed for Today's Needs and Tomorrow's Trends—
Needle Bearings Offer A Unique Combination of Advantages

The Torrington Needle Bearing has two component parts—the full complement of relatively small diameter, thru-hardened, precision-ground rollers and a case hardened retaining shell by which they are held.

The bearing is a complete unit in itself, and is easily pressed into position in a bore machined to proper dimensions. The advantages of this unit construction in simplifying installation and speeding assembly are readily apparent.

High Radial Capacity

Of special importance is the high capacity of the Torrington Needle Bearing. This efficient anti-friction unit can carry a greater radial load than any other bearing of comparable outside diameter due to the large number of rollers. The small cross section of the bearing allows a large shaft which permits a rigid design with minimum shaft deflection.

Efficient Lubrication

The method of lubrication is another feature of the Torrington Needle Bearing. The retaining shell with its turned-in lips provides a natural reservoir for the lubricant. Thus the needle rollers turn in an oil or grease bath and continually bring up a fresh film of lubricant—insuring rotation of all moving members on a fluid film.

Low Cost

The size of the Torrington Needle Bearing, coupled with the simplicity of its construction, makes it a comparatively inexpensive anti-friction unit. Its compact size encourages simplified design which requires less material in surrounding components. This also contributes to further cost reductions.

The shaft serves as the inner race in the majority of Needle Bearing applications and therefore should be hardened and ground to proper dimensions. However, where it is desirable to use an unhardened shaft, an inner race can be supplied.

For Modern Design

Where the efficiency of anti-friction operation is desired, and where space, weight and cost are vitally important considerations, Needle Bearings provide a logical answer. That's why you will find them used in an ever-growing list of applications.

This is one of a series of advertisements designed to give you the latest engineering information on Needle Bearings. Should you have occasion to work with bearing design or wish more information, write our engineering department.

THE TORRINGTON COMPANY
Torrington, Conn. • South Bend 21, Ind.
District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON *NEEDLE* BEARINGS

NEEDLE • SPHERICAL ROLLER • TAPERED ROLLER • STRAIGHT ROLLER • BALL • NEEDLE ROLLERS

CENTRAL FOUNDRY . . .

(*continued from page* 22)

include inspection, gauging, shearing, grinding, pressing, and burring, or any combination within the group.

The castings are then transferred to the shipping area where they are counted, weighed, and readied for shipment.

Grey Iron Castings

Unlike the malleable iron foundry, the grey iron foundry pours the melt directly from the forehearth of the cupola into the monorail delivery ladle, from which the pourers receive their charge. The processing of the castings in the grey iron plant is almost identical to the malleable foundry process with the modification of the annealing cycle and pertinent operations. Throughout both foundries, close check is kept upon core sand, and molding sand is tested for moisture and permeability every hour. Iron uniformity is assured by similar means.

The whole operation in both foundries is done as swiftly, cleanly, and efficiently as the best industrial machinery and talent can insure. A General Motors Corporation policy is well reflected in this last statement, for there is a constant effort upon the part of the personnel department to maintain a high level of incoming employees who can insure further development and more efficient production methods in the years to come.

Employment and General Motors

General Motors for many years has developed, from within the framework of the organization, employees for position of responsibility. Obviously, this procedure may best be maintained by the choice of young men with ability and potential. This requirement is fulfilled by people from within the ranks of the organization, college graduates and other technically trained personnel.

In following their college relation activities, Central Foundry contacts all colleges within several hundreds of miles to supplement the General Motors Institute Training Program with graduates indicating interest and ability in industrial work. In addition to the regular training program the newly hired graduates undergo, the Central Foundry Division takes selected trainees for summer work which is calculated to give as much experience as possible in foundry techniques.

As an employer, GM has taken an active interest in the welfare and protection of its employees. The General Motors' Group Insurance Plan, open to all employees, offers three types of protection at very low rates.

A comprehensive retirement plan provides for continued security in later life. Further economic security is offered by the separation allowance plan which provides financial assistance to employees who have been separated due to conditions beyond their control.

Central Foundry Division of General Motors is a growing plant which offers opportunity, valuable training and salaries comparable to any other industry within this area. Those of you who would like to add your talents to the staff of General Motors Corporation, Central Foundry Division, may find a rewarding future. The personnel department, in any case, will welcome inquiries from those of you who are interested in working and learning within the General Motors Corporation.

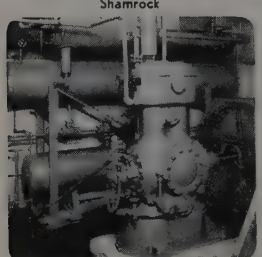
The Shamrock at Houston Uses FRICK Ice-making Equipment

One of 1,100 Rooms at the Shamrock

This new 21-million-dollar hotel relies on its Frick machinery to produce 15 tons of clear ice a day.

Just as the U. S. Army, in World War II used Frick 15-ton ice plants by the hundreds, and installed them all over the world. Still buying them, too.

The Frick Graduate Training Course in Refrigerating and Air Conditioning, operated over 30 years, offers a career in a growing industry.

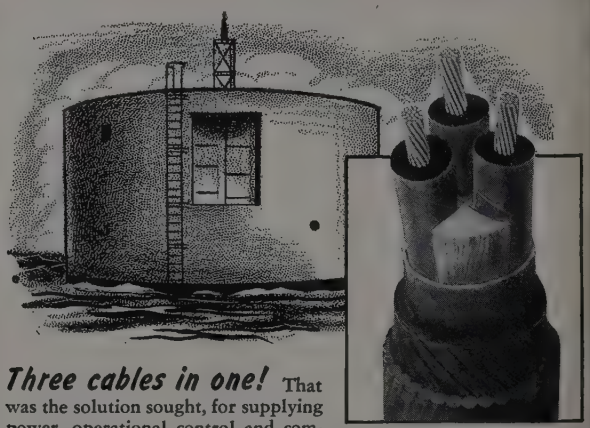


Frick 7 by 7 Compressor

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO. WAYNESBORO, PENNA. U.S.A.

Also Builders of Power Farming and Sawmill Machinery



Three cables in one! That was the solution sought, for supplying power, operational control and communication to a pumping house 4½ miles off shore in Lake Okeechobee, Florida.

As usual, Okonite engineers were consulted on the problem. Their studies showed that it was possible to combine a three-fold function in one cable. This was accomplished by the use of Okolite high-voltage insulation whose electrical characteristics permitted carrier current to be superimposed on the power conductors.

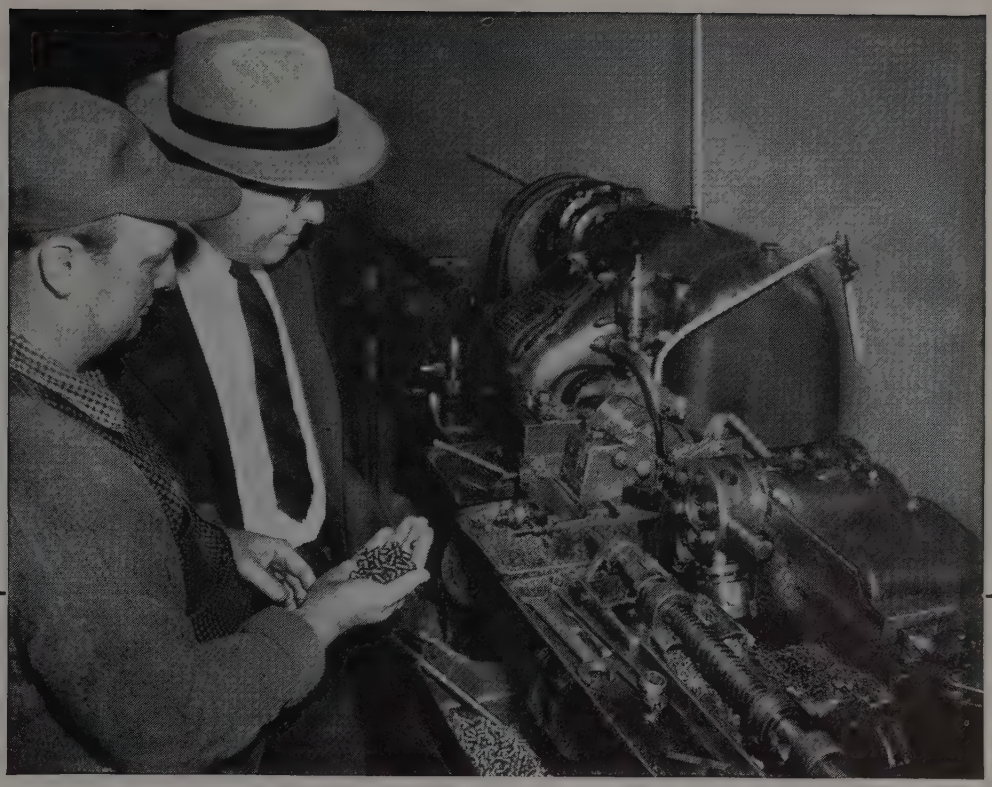
The result was a single Okonite-insulated cable—steel-armored for the 4½ underwater miles, with a non-metallic sheath for an additional 2½ miles underground—which supplies not only power and operation control, but a communication circuit as well.

• • •

Tough jobs are the true test of electrical cable . . . and installations on such jobs usually turn out to be Okonite.

OKONITE insulated wires and cables

8787



RALPH HANSEN of Green Bay, Wisconsin, a Standard Oil lubrication engineer, consults with the operator of a midwest machine shop. His recommendation lengthened by 50% the life of the cutting tools used in the automatic screw machines. The longer period between shutdowns meant higher production levels.

How lubrication engineers help save industry's costliest commodity

IN TODAY'S RACE for greater production, time has become one of industry's costliest commodities. Save time and you save real money. The right cutting oil enables tools to hold their edge longer, and also lets them cut faster while they are at work. These savings in time are a significant contribution to American industry's race with civilian and preparedness requirements.

Such was the contribution made by Ralph Hansen. And it is just one example. Standard Oil's lubrication engineers daily help maintain production capacity in many industries. They are college-trained men with advanced study in Standard Oil's own lubrication engineering school. So, they are equipped to help solve a great variety of problems—involving not only machine tools but also diesels, turbines, gear drives, electrical machinery—just about everything. They deal with equipment working under extreme heat, cold, moisture. They help select cutting oils, drawing compounds, and tempering oils.

New machines and new operations create new lubrication problems. Ways must also be found to keep old machines at peak performance. Here is a real challenge to lubrication engineering know-how.

Standard Oil lubrication engineers take real pride in their training and experience which enable them to make countless contributions to the smooth running of the national economy.

Standard Oil Company

910 South Michigan Avenue, Chicago 80, Illinois

STANDARD

M. E. DEPARTMENT . . .

(*continued from page 7*)

plays a very important part in their lives.

Research

Research has been of paramount importance at the University of Illinois ever since the Engineering Research Station, the first of its kind in existence, was established here in 1903. It is the general policy of the M. E. department to undertake research only on those projects which appear likely to add knowledge in specified areas of engineering. The cost of research is shared by the University and one or more outside sponsors. Over any length of time, more than one-half of this total cost is provided by the outside sponsors.

Through the years, research has been carried on in numerous areas of mechanical engineering. Some of the present or most recent areas include: warm air, steam, and hot water heating; internal combustion engines; flow of fluids; smokeless combustion of bituminous coal in hand-fired furnaces; ventilation; metal cutting; and the effect of atmospheric environment on human beings and animals.

Warm air furnace research is one of the oldest fields in which research is currently being conducted by the M. E. department. This cooperative investigation with the National Warm Air Heating and Air Conditioning Association has been in continuous operation since 1918. Recent activities in this field have been principally conducted in the two research residences erected in 1947 and 1949. Also the department has available for its use a third research residence, a floor slab laboratory, and a mobile testing laboratory. Typical of research in this field was the work done last year to determine the performance of a heating system with the furnace located in an enclosed furnace room or closet. A study was made for different arrangements of supplying combustion air into the enclosure and for ventilating it.

The residence built in 1949 has been used for perimeter warm air heating investigation since shortly after its construction. In the summer of 1950, alterations were made so that four different arrangements of ducts could be studied alternately throughout the 1950-1951 heating season. During that heating season, a great amount of valuable information was obtained which is being used in the design of perimeter warm air heating systems for small houses.

A unique group research program is now being conducted with the cooperation of other departments of the University and the College of Medicine in Chicago. This program is concerned with the study of the effect of atmospheric environment on human beings and animals. The center of this work is the physical environment laboratory located in the mechanical engineering laboratory building. Here physical facilities are provided for the control of the temperature, pressure, humidity, cleanliness and motion of air over sufficient ranges to cause physiologic stress in humans and animals. Although this type of research has been carried on since 1935 at the University's Medical Department in Chicago, extensive facilities on the Urbana campus were not installed until recent years. In its comparatively short life span, the environment lab has already been put to good use by several departments of the University.

The new ultra-modern Mechanical Engineering Building completed in 1949 at the corner of Green and Mathews.

An example of the type of work conducted in the environment lab is that done by the Institute of Aviation in the school year 1950-1951. Six simulated flights to an altitude of 15,000 *ft* were made as a demonstration of the use of oxygen to students in the Institute's pilot training courses. Ten similar flights were made in connection with the study of a possible new method for early recognition of impraised circulation. This group research program, which has been actively participated in by the departments of physiology, psychology, physical education, and aviation, displays the need for persons trained in both the biological and technological sciences.

Another very different type of research, which was started in 1948 for a period of one year and has been continuously renewed since then, is the study of the economic effects of the use of friction-type bearings on the railroads of the country. Taking part in this program are the Timken Roller Bearing Company, the M. E. department, and the college of commerce. Aside from these three active participants, several large rail lines are providing the huge amounts of information needed which can be obtained only from the railroads' files.

The work done thus far has been limited to friction bearing operation on freight cars only. The first topic studied was the total cost of all supplies, maintenance, delays, and accidents traceable to the use of friction bearing cars. Other topics under study are tonnage limitations due to low temperatures, bearing limitations in high speed service, and loss of perishable freight due to bearing trouble. Under the most intensive study so far has been the Illinois Central Railroad, where 2,375 cars were investigated. The Great Northern was selected as the second road for study because of its northerly location; it will be followed by the Santa Fe, a road which experiences converse weather conditions. It is felt that the massive amount of data obtained from this project, when evaluated, will provide priceless information to the industries involved and will allow them to pass on to the general economy savings many times as great as the research cost.

The M. E. department feels that research and education must not be separated and therefore strongly encourages research staff members to do some teaching, and instructional staff members to participate in research part time.

Facilities

Everyone knows that to conduct re

(*continued on page 28*)

What decides wages?

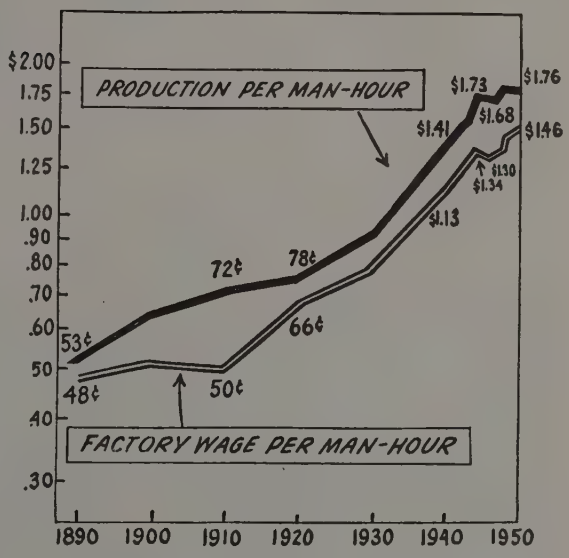
What you and I produce

THERE IS ONE RULE OF NATURE that all the governments, laws, unions and contracts cannot change: a man can be paid *only* out of what he produces, and the more he produces the more he can earn.

AND, that line "Factory wage per man-hour," shown in the chart at right, has gone up and up only as American business has put better and better *machines* to team up with American workers. *Machines* help the worker produce more and so earn more.

And *machines* can come only from the savings of investors—the savings made out of investor profits.

So—profits plus machines plus workers who use them well, equal constantly rising savings and standard of living. Whoever attacks *profits* is attacking *you,* and your family. Never forget it.



Production per man-hour represents the total national income produced per man-hour worked by all employed persons. Factory wage represents average hourly earnings of factory workers. All figures are in dollars of 1950 buying power to eliminate price changes, and show real purchasing power.

Source: Labor's Monthly Survey, American Federation of Labor.

WARNER & SWASEY
Cleveland
Machine Tools
Textile
Machinery

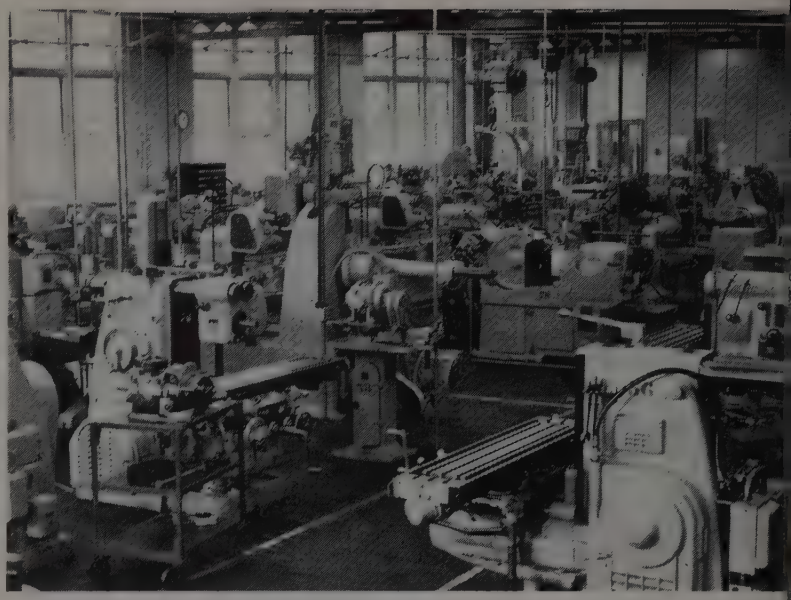
YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS AND TAPPING MACHINES

M.E. DEPARTMENT . . .

(*continued from page 26*)

search effectively many types of equipment are needed. Also necessary are the men to operate that equipment and evaluate the data compiled. The M. E. department rates high on both of these counts. With the opening of the new biulding at the corner of Mathews and Green in 1949, a tremendous expansion of both research and teaching facilities was made possible. This ultra-modern building contains over 87,000 square feet of usable floor space which includes 16 laboratories, 13 class rooms, 7 design rooms, 5 lecture rooms, and 46 offices.

Among the largest and most fully equipped laboratories in the internal combustion laboratory located in the M. E. building. This lab contains ten dynamometers for engine testing, all of which are capable of operating at speeds up to 6000 *rpm.* A complete set of electronic instruments is also available for determining vibration characteristics, pressure changes, and combustion and detonation phenomena. One dynamometer when used with aircraft engines can be arranged so that intake and exhaust pressures may be made to simulate adverse altitude conditions. Some of the other large laboratories are the power laboratory, machine tool laboratory, and thermodynamics laboratory.



Room 217 of the new M.E. building contains more than one hundred machine tools and is designated the Machine Tool Laboratory.

Staff

Several famous and illustrious men have served on the staff of the M. E. department. Among these is Dr. A. C. Willard, who has been with the Unive sity of Illinois since 1913. He has inde had a very colorful career starting the heating and ventilating branch. H headed the M. E. department fro 1920-1934, acted as head of the co lege of engineering for two years, a then served in the capacity of preside of the University from 1934-1946. Fr quently Dr. Willard was employed consulting ventilation engineer on i portant jobs such as the Holland Tu nel and the Chicago Subway. T lounge on the main floor of the M. building is dedicated to this outstan ing staff member who now holds t title of president and professor of hea ing and ventilating, Emeritus.

Today the M. E. department is hea ed by Dean N. A. Parker. Dean Par er, who was educated at the Univers of Colorado, served on the mechanic engineering staff there the greater pa of the interim between 1930 and 194 During that time he took on many i teresting and important side jobs amo which was the designing, building, a testing of a two-place aircraft for t Combs Aircraft Corporation in De ver. While at Colorado, he design and built the University's wind tu nel.

Since attaining his position at Illino Dean Parker has done a great deal ward the advancement and enlargeme of the M. E. department. The revisi and addition of courses, along with t inauguration of the option system, ha all been done in line with the gene opinion that engineers of today can e hance their chances for a successf career by following a well planned ed cational policy.

● For many years K&E has pioneered in the manufacture and development of finest quality surveying instruments. K&E surveying instruments are renowned all over the world for their superb performance under conditions of all kinds, for their magnificent workmanship and for special features that come of progressive ingenuity.

KEUFFEL & ESSER CO.

EST. 1867

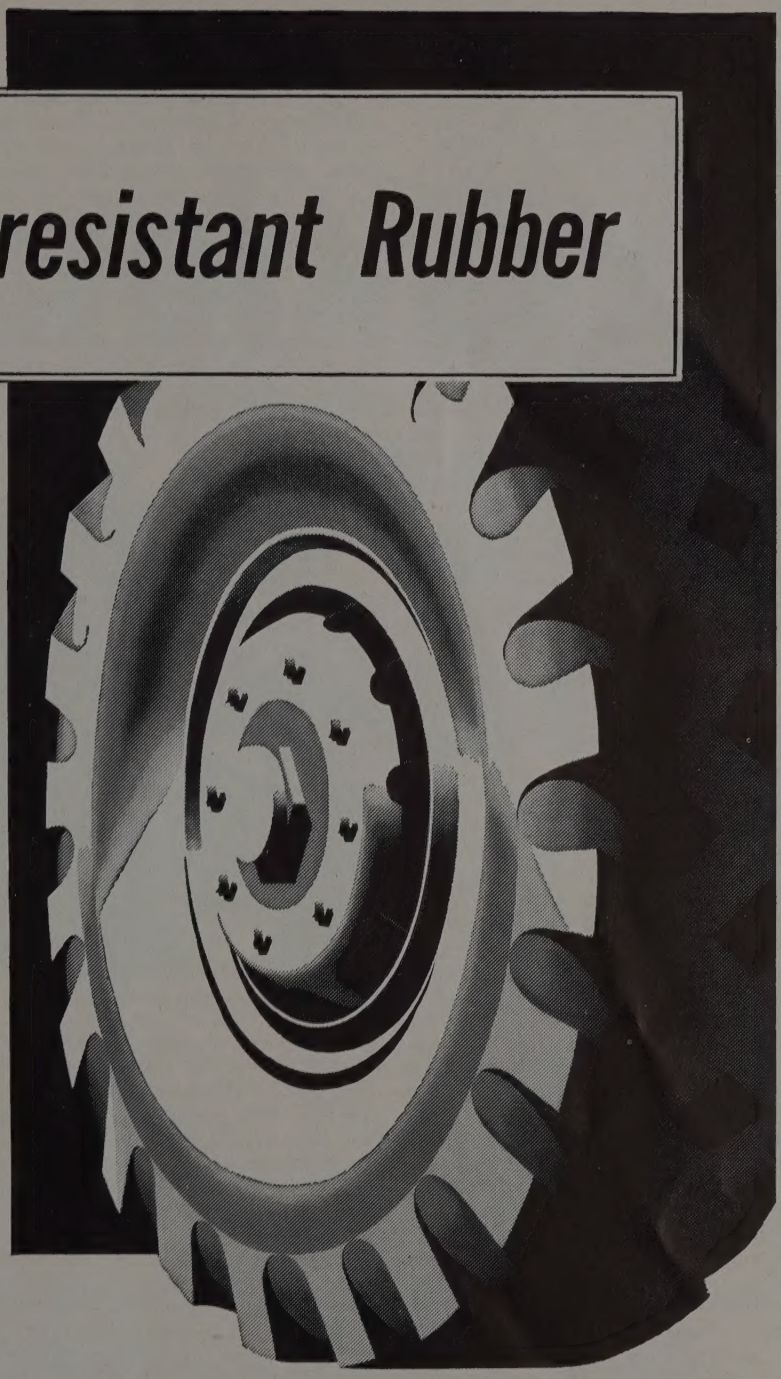
NEW YORK • HOBOKEN, N. J.

Chicago • St. Louis • Detroit • San Francisco • Los Angeles • Montreal

K+E

Drafting, Reproduction and Surveying Equipment and Materials, Slide Rules, Measuring Tapes.

Abrasion-resistant Rubber



CHEMICAL PROBLEM...

. . . tires that withstand abrasion better and last longer in service.

SOLUTION...

. . . "cold rubber," the latest type of synthetic rubber made by Hercules customers, which has superior wearing qualities. Its name comes from the unusually low temperature of 41 deg. F. at which it is made. Special catalysts were needed for this "cold rubber" and Hercules had the answer ready with its hydroperoxides. These chemical catalysts initiate the polymerization of the two basic components of "cold rubber"—butadiene and styrene.

COLLEGE MEN...

This is but one example of the far-reaching chemical developments in which you could participate at Hercules—in research, production, sales, or staff operations. It suggests the ways Hercules' products serve an ever-broadening range of industries and end-uses.

Hercules' business is solving problems by chemistry for industry...

. . . paint, varnish, lacquer, textiles, paper, rubber, insecticides, adhesives, soaps, detergents, plastics, to name a few, use Hercules® synthetic resins, cellulose products, terpene chemicals, rosin and rosin derivatives, chlorinated products, and other chemical processing materials. Hercules® explosives serve mining, quarrying, construction, seismograph projects everywhere.

HERCULES

HERCULES POWDER COMPANY (INCORPORATED) *Wilmington, Delaware*

Sales Offices in Principal Cities

EC83-1

NAVY PIER . . .

(*continued from page* 12)

In the American Institute of Electrical Engineers—Charles Kersch, Ronald Kowalik, Jack Margolis, Vito Minerva, Frank Pease and Frances Watkins. Miss Watkins is chairman of the Engineering Societies Council.

In the American Society of Mechanical Engineers—Harry Rogers and Oliver Smith.

In the Institute of Aeronautical Sciences—Phillip De Protine.

On the Technograph—Warren H. Brandt.

Another feature of the big engineering week was a presentation by the University of a panel discussion on the "Employment of Engineers in the Integrated Petroleum Industry."

The moderator for the discussion was Dr. R. W. Karpinski, professor of geology at the Pier who introduced the panel of experts in the petroleum field. Those present were, Dr. J. V. Harrison, former exploration geologist and Oxford professor, now a member of the geology faculty at Urbana; Mrs. K. A. Mygdal, assistant chief, department of exploration and production, Pure Oil Company; Mr. Harry Whitemore, chemical engineer, Universal Oil Products Company; Professor J. C. Chaderton, head of the civil engineering department at UIC, and Mr. Robert F. Baldaste, assistant administrative director, Whiting refinery, Standard Oil Company.

Professor Chaderton led the discussion by outlining the civil engineer's place in petroleum geology with emphasis on research and exploration. Professor Chaderton spent several years in Venezuela working on refinery layouts, pipeline routes and transportation facilities to oilfields.

Mr. Whitemore stressed the opportunities existing in the United States for qualified engineers. He reviewed the procedure of his company with respect to advancement for the young engineer and compared the pay scales of the petroleum industry with those of other firms employing engineers.

Mr. Mygdal and Mr. Baldaste further enlarged on the civil engineer's place in petroleum. Mr. Baldaste invited the engineers present to visit the Whiting refinery in order to gain an insight into the vastness of the industry.

Dr. Harrison presented the economic and political potentialities of oil and the position of the engineer in its production.

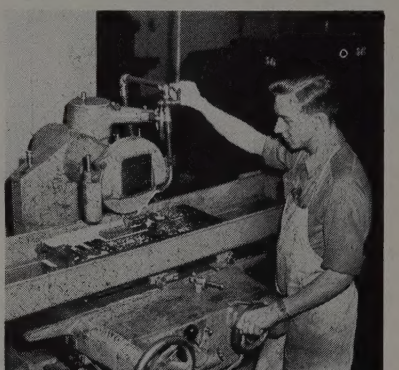
The meeting closed with a question and answer period which further emphasized the great number of employment possibilities available in the petroleum industry for engineers of all branches.

Mechanical Engineering at Navy Pier

An efficiently operated department at UIC is that of mechanical engineering. At the Pier, the M. E. department consists of one office, one materials processing lab, one materials costing lab, one welding and allied processes lab and two lecture rooms.

Visitors have been known to comment on the marvelous equipment in the department and the way it is maintained. Few people who enter the UIC branch can say that their observation did not surpass their expectations.

Much of the equipment in the metal processing laboratory is of recent vintage due to the large amount of surplus



Student operating surface grinder

machinery offered after the war. Skillful speculation has equipped our labs with some of the finest machines available at a very low cost to the University. Associate Professor J. S. Kozacka, department head, is responsible for a great deal of the foresight in purchasing this equipment.

The foundry and materials casting laboratory gives the student an opportunity to work on modern equipment of the type being used in industry today. An electric arc furnace with a 300 *lb* capacity is used for melting grey iron and steel. Complete ventilation is provided for fumes and a water jacket keeps the temperature of the furnace and of the room at a minimum. Facilities for hand, squeezer and rollover molding are available for production operation which is assisted by a small sand conveyor system. A sand testing lab with equipment for preparing samples and testing them is available and in operation. This room is also a metal testing lab with several testing devices for determining physical characteristics of prepared metals.

Adjacent to the melting and molding room is a core room which is equipped with several devices for high spee work. Included are a core blowing ma chine, an automatic oven for bakin cores, sand mixers, and a jolt machin

At the present time, four courses ar being offered by the mechanical enginee ing department. These courses are ider tical to those at the Urbana-Champaig campus. M. E. 171, a course dealin with the transmission and modificatio of motion by gears, cams, ropes, chain etc. is required of all M. E.'s excep aeronauticals. Manufacturing Proce ses, 182, gives aeronautical engineers general knowledge of fabrication an production operations with special weld ing training. It also concerns the theor behind the operations which are done i the laboratory as discussed in the lec ture rooms. Materials Casting, M. E 183, concerns casting as a process o fabrication, physical characteristics o metals, and primary metallurgical con cepts. Shop practice in molding tech nique, sand control, core making, melt ing practice and testing of cast metal is covered in the laboratory. M. E. 184 Metal Processing, concerns the elemen tary processes in machining used fo production work. Lectures are conducte which deal with cutting speeds, ma chines, and machining processes. Labora tory work combines theory and tech niques of metal fabrication.

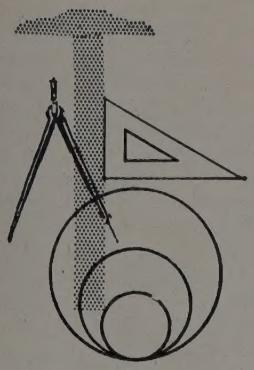
The welding lab, used primarily b aeronautical engineers, has individua booths for arc welding, featuring new welding units. Outlets for torch use are provided for each of the students i addition to a work table and accessorie for each operator. Spot and heliarc weld ing equipment are in operation in orde that specialized and production trainin may be obtained.

The metal processing lab or machin shop is capable of producing practicall any object in small lots or productio Many of the castings which are mad in the foundry receive their machinin in the laboratory so that students ma observe the complete sequence of opera tions in the production of metal parts An inspection laboratory, in which stu dents accurately measure their project and specially designed objects, is used t a high degree. Jigs and fixtures are usec as in industry, for much of the work t produce interchangeable parts.

Mechanical engineering at the Pie as in other schools, comprises a very larg percentage of the students enrolled i the engineering college. Out of the 67 students listed as engineers 198 are i the mechanical curriculum giving ris to a percentage of 29 per cent.

To promote interest and a higher de gree of proficiency, the students are a signed projects in the various courses o fered at the pier. These projects giv

(*continued on page* 32)



ENGINEERS

Special opportunities for YOU in

SAN DIEGO

that sunny, beautiful coastal city in

CALIFORNIA

Positions Now Open

Design Engineers
Design Draftsmen
Electrical Draftsmen
Electronics Engineers
Microwave Engineers
Servo Engineers
Weight Engineers
Aerodynamics Engineers
Test Engineers
Thermodynamics Engineers

Convair also has a limited number of attractive openings for recent engineer graduates: Aeronautical, Mechanical, Electrical Engineering and Civil Engineering interested in Aircraft Structural Design.

Working Facts

You get two holidays a week at Convair — overtime accomplished in 5-day week. Attractive salary ranges. An "engineers" engineering department... with stimulating, competent associates ...and interesting, challenging, essential, long-range projects of a wide variety including — commercial aircraft, military aircraft, missiles, engineering research and electronic development. Excellent patent royalty arrangements. Top-notch retirement plan — better-than-average life and health insurance. Complete progress-salary review for each person twice yearly. Opportunity for continuing engineering education.

If you qualify, you will receive generous travel allowances.
***SEND COUPON NOW* for free booklet giving complete information.**

THANK YOU

Mr. H. T. Brooks, Engineering Department H
Convair, 3302 Pacific Hiway, San Diego 1, California

Please send me FREE booklets describing the Convair Opportunity for me and my Convair Application Form.

My name _____

Address _____

City _____ **State** _____

NAVY PIER . . .

(*continued from page* 30)

them an opportunity to apply the knowledge they have gained and also analyze problems to the point where a remedy can be easily obtained. In all of these, personal initiative is strongly encouraged.

The project in Materials Casting, for instance, is a complete layout of a foundry based around the casting desired. The student is given a blueprint of the part to be manufactured and from this he decides the pattern construction, type of molding, type of furnace, plant layout and all related devices or systems pertinent to its manufacture. He is encouraged to write to professional men to receive their ideas on the manufacture of the object.

Much of the time spent in the metal processing lab is devoted to set up of machines as the student sees fit. Here, too, he is allowed to determine in his mind what the most efficient sequence of operation is and has sufficient equipment with which to carry it out. Many of the projects have a practical use and can be purchased by the students if they pay for the materials. This is an added incentive to do good work.

Because of the location of the Pier, in the midst of a great industrial area, jobs for the students during the summer months can be easily obtained. Cooperation of the M. E. department with many of the Chicago firms provides a constant source of employment for men desiring it. During the last summer, it was estimated by Mr. R. W. Schroeder that 15 students obtained jobs through the efforts of the department. This not only provides an income for the student but develops a closer relationship between industry and education which is good to have when a necessity arises for it. Employment upon graduation is influenced greatly by this familiarity.

Prominent among the professional organization at UIC campus is the Student Branch of the American Society of Mechanical Engineers. Sponsored by Professor Kozacka it boasts a membership of over fifty students with many prospective members. Meetings are held approximately twice a month with, if possible, a speaker or film at each gathering. Subjects of a diversified nature usually are in greatest demand by the members and are given to them. Recently, a successful field trip was conducted to the Central Foundry Division of General Motors in Danville and also to the engineering department downstate. Enthusiasm over the trip was exuberant being shown by the amount of students that had to be turned down after reservations were completely filled.

At the head of the department is Associate Professor J. S. Kozacka, who graduated from the University of Michigan with a masters degree. Since graduation he has had experience with General Electric, Packard Motor Car, Chrysler Corporation, Pratt and Whitney, and Vascology-Ramet Corporation, manufacturers of tungsten carbide tools. After working in the field for many years he turned to teaching and supervision of engineering shop laboratories at Lewis Institute and Illinois Institute of Technology. During much of his work he specialized in industrial engineering and research in metal cutting techniques and tungsten carbide bearings.

Roy Schroeder, instructor in materials casting, formerly taught foundry practice at Urbana, Crane Tech. High School in Chicago, and Washburne Trade School in Chicago. Much of his experience in industry was with the Western Electric Co. He is active in the American Foundrymen's Association and the Student Branch of the A S M E at the Pier.

Robert Kennedy, before coming to the Pier, taught downstate where he served in the capacity of assistant professor. His interest lies primarily in foundry work where he has achieved much fame for many of the new methods now used in casting processes. He graduated from the University of Illinois with high honors. At the present time he is Secretary Emeritus of the American Foundrymen's Association and is also active in the Foundry Educational Foundation.

Arnold C. Cobb, instructor in theoretical and applied mechanics graduated from the Pennsylvania State College where he received his B. S. and M. S. in mechanical engineering. He has been employed by the N. Y. C. and St. L. R. R. (Nickel Plate Road) where he served in various capacities, by the American Steel and Wire Co., and the Socony Vacuum Oil Co. He has teaching experience at University of Minnesota, North Dakota Agricultural College and the University of Illinois. He is currently a member of the A S M E and Pi Kappa Alpha Fraternity and a former sponsor of the UIC Student Branch of the A S M E.

Assistant professor of mechanical engineering at the Pier is Roy B. Perkins, who obtained his B. S. at University of Wyoming and his M. S. at Cornell. He has instructed in institutions such as the School of Vocational and Adult Education in Wausau, Wisconsin, Cornell University, and the University of Illinois. He is an active member of American Society for Engineering Education, American Welding Society, and the American Association of University Professors.

OPEN HOUSE . . .

(*continued from page* 10)

harmonized color with its music.

A variety of movies of processes and fields of engineering were shown, and numerous models and displays were to be seen throughout North campus.

Such was the magnificence of the 1950 Open House. A conservative estimate of the number of guests in attendance was placed at 10,000, a large proportion of whom were high school students. The 1952 Open House promises to surpass all its predecessors in its exhibits and attendance.

Plans for the '52 Open House are well under way, the committees already having been set up. General chairman of the open house this year is Jim Garman, a senior from Bethany, Illinois. An honor student as well as an activity leader, Jim will receive two degrees come June, one in mechanical engineering and one in agricultural engineering. The four committee chairmen are Ed Fort, publicity; Charles Hudson, program; Dan Levin, physical arrangements; and Duane McCurdy, parade. Bob Coughlin is the secretary-treasurer.

The details of this year's Open House are not completely worked out yet, but they will be reported in the coming issues of the *Technograph*. Above all at this moment, we are inviting *you* to the 1952 Engineering Open House. As Dean Enger said in his welcome to the visitors at the '41 Open House, "The students and the faculty of the college of engineering give you a hearty welcome to this exhibition of the facilities of the college. The laboratories will be in operation and various tests and demonstrations will be explained. We hope that you will see as much as possible of the exhibition and carry away a clearer impression of the many activities included under engineering."

"Touchdown" Saunders, football player for a southern school, was having trouble with his grades. Since he was the star player on the team, his services were needed. He was called into the principal's office for re-examination.

The school head decided to give Saunders a one-question examination. And since he was a Florida boy the question was: "What is the capital of Florida?"

"Touchdown" sweated over this for some time and finally wrote Monticello on his test paper.

He passed. In checking the answer the principal said 100 was perfect and Monticello is twenty-five miles from Tallahassee. Twenty-five from 100 leaves seventy-five. And seventy-five is passing.